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INSTITUTE FOR DEFENSE ANALYSES

Federated Architecture in the Defense Business Transformation

Selected IDA Papers and Briefings

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Preface

This document consists of a collection of informal papers and briefings bearing on the subject of federated architecture. The papers and briefings were prepared in support of the Department of Defense's substantial effort to transform and modernize the Business Mission Area, now the Defense Business Transformation (DBT), formerly the Business Management Modernization Program (BMMP), by the Institute for Defense Analyses under task order BF-5-2105, Independent Assessment of Conflict of Interest and Other Issues in the Business Enterprise Architecture (BEA). Following a short Introduction, a Background section and a short exposition on the Federated Approach, the papers and briefings are included, each preceded by a short description of the circumstances under which each paper was developed and delivered. The papers themselves appear exactly as they were delivered at the time, without any further editing.

We thank Dr. Paul Tibbits, Director, Business Management Modernization Program (BMMP), with a tenure spanning much of the period that the material was developed, for his support of federation concepts and also Ms Marilyn Fleming and Mr. Brian Wilczynski, successively the chief architects of the BEA during that period, for their support.

This document was reviewed by IDA Research Staff Members, Dr. L. Roger Mason, Jr. and Dr. Francisco Loaiza-Lemos.

Contents

Introduction

The office of the Under Secretary of Defense (Comptroller) (USD (C)) tasked IDA to support the Business Management Modernization Program (BMMP) office starting in December 2002. IDA tasking assignments initially focused on activities of monitoring and identifying potential Organizational Conflict of Interest risks that might impact the program or participating contractors. However, the primary focus of activities was quickly broadened to include a wide range of technical monitoring and assessment responsibilities. In this latter capacity, IDA starting in mid-2003, began promoting the concept of a federated architecture. A number of IDA point papers, draft documents, and briefings on this concept have resulted. The purpose of this document is to present a time-ordered compilation of these contributions, illustrating the initial ideas as presented and continuing development and maturation of the approach over the two year span covered. Note that most of these papers were delivered, before the October 7, 2005 establishment of the Business Transformation Agency (BTA), which now has responsibility for the Defense Business Transformation.

Since that time, the Director, Architecture and Interoperability, ASD NII, has chartered the Federated Joint Architectures Working Group (FJAWG) which is developing a strategy for federation of the GIG Architecture. Consequently, some of the views expressed in this document may not be consistent with current DOD CIO guidance on this topic.

Background

The BMMP had been established by the Secretary of Defense in July 2001, initially as an important initiative toward providing the Department with relevant, reliable, and timely financial information to facilitate effective decision making.[1] Over time this has come to be understood more generally as an approach to transform all the business practices of the Department to best serve the warfighter as well as to provide clean auditable financial data. Thus the objective of the BMMP is to "ensure that the Department's Business Mission Area (BMA) rapidly delivers to our warfighters the right capabilities, resources and materiel: What they need, where they need it, when they need it, anywhere in the world. In order to cost-effectively and prudently meet these requirements, DoD's current business and financial management infrastructure—processes, systems, and data standards—are being transformed. DoD's business transformation is focused on providing end-to-end integration of operations in support of missions in times of peace and war. From a financial accountability standpoint, transformation will provide accurate, reliable, and timely financial information, affirmed by clean financial audit opinions."[2]

Such a transformation demands, by both good practices and Department policy, a disciplined process to develop the necessary plan of approach. The primary components of this process are (i) the development of an architecture defining the "blueprint" for the entities to be transformed and (ii) a transformation plan delineating the control and the "time-line" for executing the blueprint.

An initial release of these products was delivered in April 2003, on the schedule that had been set. The products were by no means complete, but considering the magnitude of the challenge and the short time that the initiative had been in existence, it was quite an accomplishment.

The effort to produce a more refined version of these products, in what must be a continuing evolution "spiral development" approach, started immediately after the initial delivery. But with the early experience it became quite evident that in so large and complex an organizational structure as the DoD, along with multiple and varied missions and cultures, that to successfully build an architecture that could lead to a successful transformation of the Department's business practices required a more detailed understanding of how to organize the design effort.

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[1] Initially the initiative was designated the Financial Management Modernization Program (FMMP). The name was changed to BMMP, when it became clear that the scope of the modernization transformation was a broader business transformation.

[2] http://www.dod.mil/dbt/mission_why.html

Initially there were multiple ideas as to how this should be accomplished. The requirement was to produce a Business Enterprise Architecture (BEA), which could (a) satisfy the needs of the five Core Business Mission (CBM) areas (— initially these were six Domains), (b) be implementable by the various DoD Components, (c) be interoperable amongst the various entities, and (d) be consistent with the rules imposed by the Global Information Grid (GIG), the Federal Enterprise Architecture (FEA) Reference Modal, and by Congress.

Federated Approach

Starting early in 2004, a number of serious approaches for attacking the problem were proposed. In abstract terms, the two polar extremes of these various ideas could be characterized as (i) a single Enterprise Resource Program (ERP) across the Department, and (ii) a federated approach. Of course between these two limits there are many possible variants. The federated approach was introduced early in 2004 by IDA (as well as by some others), and IDA has championed the federated approach since then. Given the complexity of the Department, it appeared to IDA that a single ERP approach, or anything near a unified ERP was unlikely to be workable. During the past year, the federated approach has been adopted for the BMA transformation.

As required by the National Defense Authorization Act of 2005, on September 30, 2005 and on time the current BEA, designated BEA 3.0 was delivered to Congress. "The BEA 3.0 provides the architectural framework for an information infrastructure for DoD, including business rules, requirements, data standards, system interface requirements, and the depiction of policies and procedures."

BEA 3.0 was developed under the DoD Tiered Accountability concept reflecting the Business Enterprise Priorities (BEP) within the Core Business Mission areas. Through this concept, a DoD Component is responsible for defining an enterprise architecture associated with their own tier of responsibility, while complying with the policy and BEA at the DoD Enterprise-level. Within the DoD Business Mission Area, the BEA and Component Enterprise Architectures provide the required guidance as part of a federated approach. Additionally, the BEA is federated with the Federal Enterprise Architecture and other external architectures. Subsequent releases of the BEA will continue to use a federated approach to define and enforce the seams or interfaces between each tier, thus ensuring interoperability and information flow to support decision making at the appropriate level.

This federated approach for the BEA is markedly different from earlier attempts to manage a single, centralized architecture spanning the full range of functions and activities of the Department. This transformation effort focuses on providing tangible outcomes for a limited set of priorities, and on developing architectures that are linked, realistic, and actionable. The current scope, defined by the six BEPs, permits the BEA to develop and expand in a controlled and consistent fashion. The framework and architecture products developed for these BEPs may be extended to all defense

business systems and initiatives. As new priorities are identified and existing priorities mature, DoD may refine and extend the BEA to address the required capabilities."[3]

Over the past two years IDA has provided a number of informal papers and briefings for the senior line management of DBT expounding on the merits of the federated approach. This document assembles a collection of the more important of these papers, in a time ordered sequence, spanning the period January 2004 through January 2006. Note that the focus of the issues under discussion has changed over that two year period. Initially, the focus was to expound on the merits of the federated approach for the problem at hand. Now that there is widespread embrace of the federated approach, IDA has been encouraging DBT management to more actively embrace and to facilitate its application in the instantiation of transitioned business systems and enhanced systems interoperability. To accomplish this will require the establishment of new federation by-laws and concepts of operation. In addition to a wide range of governance issues that must be addressed, specific technical areas that need to be addressed include definitions of processes and process exchange protocols, and data and metadata and data exchange specifications. The establishment of standards, agreements, taxonomies, etc. are crucial to the attainment of the goal of transparent federated interoperability to best support the warfighter.

Since very little has been yet committed amongst the Components in addressing these matters, there is a currently a time window of opportunity to coalesce the Department's thinking and action. If action is not started soon it will be much more difficult to achieve coherence and achieve the BMA transformation goals. In IDA's view, the thinking across the Department has not yet matured to a consistent understanding on this matter. The more recent papers in the collection begin to address this issue.

[3] http://www.dod.mil/dbt/tools_bea.html

BEA Architectural Terms Tutorial

This paper, with a goal of clarifying the use of architectural terms, was distributed in several minor revisions to a number of senior BMMP line managers, including the BEA chief architect, starting in January 2004. Note that the last section on page 12 introduces the federation concept.

BEA ARCHITECTURAL TERMS TUTORIAL

Ambiguity in the Term "Architecture"

Relevant to the BEA context, the term "architecture" can be used two ways: One, to refer to the *real* (material or physical) *configuration* of (or set of relationships between) the parts of a machine or building or information system. Two, to refer to a *depiction* (a written or verbal description, a drawing, a formal schematic, etc.) of the configuration referred to in the first sense described above. An architect, in the process of designing a building (or an information system), generally produces *drawings*, that depict the architecture to be imbued in some eventually built physical building or information system. The set of drawings is not the physical building or the information system, but its representation. In this tutorial the two definitions will be explicitly indicated as architecture (1) and architecture (2).

BEA by Analogy to the New World Trade Center

In this description references to the World Trade Center are *italicized* and the analogous BEA entities appear in square brackets [ ].

- *Daniel Liebeskind* [ASD(NII)], *master planner* [NII] for the *World Trade Center site* [DoD], has responsibility for the architecture (1) of the *new overall multi-building complex* [GIG].
  - A set of conceptual drawings [DoDAF OV-1 diagrams—one of many architectural products] initiates the description of the architectural (2) design—the "To Be architecture (2)."
  - As the design of the *various buildings* [GIG components] proceeds, details of the architecture (1) are developed, respecting to the extent possible the original concept, but also conforming to the requirements of the *WTC owners* [Domains, their Services, and Components] and to the *legal and formal and informal building codes* [legislative and DoD policies and guidelines].
  - During this process the original architectural (1) conceptual design will evolve to satisfy all these conditions and will be documented in the To Be architectural (2) diagrams.
- Responsibility for the *architecture* (1) *of the Freedom Tower* [BEA*], one of the buildings, was assigned to David Childs of the architectural firm *Skidmore Owings & Merrill* [BMSI].
  - At the outset the architect had a problem with Liebeskind's conceptual design.
  - This problem was resolved with interaction between the *master planner* [NII] and the *Freedom Tower architect* [BMSI], resulting in a *set of compromises based upon functional and enterprise requirements* [BPR and Governance]. This in turn resulted in some changes of the architecture (1) and of the OV-1 diagrams describing that architecture (2).

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* BEA here means the Business Enterprise Architecture (1).

- As the various *tenants of the Freedom Tower* [Domains] design their space to *optimize their functional requirements* [BPR] there will be repeated needs for the *building architect* [BMSI] to adjust the architecture (1) in consultation with each *tenant* [Domains, their Services, and Components] and any of the other *tenants* [other Domains, their Services, and Components] that may be affected by such changes. The *building architect* [BMSI] will also have to *assure that these architectural* (1) *adjustments are consistent* [Governance] with the *overall Freedom Tower architecture* (1) [BEA] and with the *complex master plan* [GIG]. Evolving requirements may result in changes to the *complex master plan* [GIG] or to the *Freedom Tower architecture* (1) [BEA] or the requirements may have to be modified to accommodate either or both of these overarching plans.
  - This process is iterative as the details of the various tenant architectures (1) are further developed.
  - Indeed, the process continues as the implementation of the design proceeds.
  - The process also continues into the maintenance period once the implementation is completed to accommodate to new technologies as they become available and to meet new requirements as they develop in the future.

- Note that during the design of the *Freedom Tower architecture* (1) [BEA], compromises at multiple levels are negotiated between the several layers of architectural authority within the enterprise architecture (1) governance structure to accommodate the requirements and preferences of all the stakeholders.
  - Configuration management of both the architecture (1) and its architectural (2) description remains the responsibility of the *Freedom Tower architect* [BMSI].
  - Configuration management of each of the *tenant* [Domains, Services and Components] architectures (1) and their architectural (2) descriptions is the responsibility of each of the respective *tenants* [Domains, Services and Components].

- The story above pertains to the *architecture* (1) *of the Freedom Tower* [BEA] within the larger *World Trade Center* [GIG].
  - The description of that *architecture* (1) [BEA] is given in numerous *architectural (2) products* [DoDAF conforming architectural (2) products].
  - Unfortunately the description of the BEA is also frequently referred to as the BEA, causing unnecessary confusion. To distinguish between the architecture (1) and a description of the architecture (2), here we will use DoDAF BEA to mean the description of the BEA to distinguish that description from the actual BEA.
  - The one fundamental requirement is that as the BEA evolves within the rules of the Governance process, the DoDAF BEA must be updated to correctly represent the actual BEA.

- Instantiations into functional products (business applications) by the Domains, the Services and Components in software/hardware conforming to the BEA might be called "BEA conforming applications."

Some Additional Comments on the BEA

- To facilitate the generation of the DoDAF BEA one of several DoDAF conforming tools may be used.
  - It is incumbent on BMSI to maintain an up to date repository of the DoDAF BEA (at all levels) accessible at all levels by at least one tool.
  - Consistent with the current NII position, any DoDAF architectural description built with any tool that conforms to the DoDAF should be transformable, using appropriate middleware, into a form accessible to any other such tool. (This issue is still under study by NII.)
  - Consequently, a Domain, Service or a Component may use any tool that meets the DoDAF requirement in order to represent its local architecture (1).

- Different stakeholders have different needs in viewing the BEA.
  - All views are derived from the BEA, documented in the DoDAF BEA.
  - The stakeholders include a very wide range of participants, each with interests requiring their unique views, including:
    - Functional users at all levels
    - Functional managers at all levels
    - Program managers at all levels
    - Implementers of all implementation components
    - Maintenance personnel
    - Designers of the next evolutionary step
    - Cross Domain Integration contractor(s)

- To facilitate the expeditious instantiation of the *Freedom Tower architecture* (1) [BEA] an execution approach could be to organize the effort into several Increments. Each of the Increments provides a subset of the required enterprise functions. The various detailed systems architecture (2) designs and contractors to implement the architecture (1) for each of the functions are provided by the *functional entity organizations* [Components]. In all cases the overall *Freedom Tower architecture (2)* [BEA] defines the enterprise approach for the various systems architecture (2) designs and architecture (1) implementations.
  - The first Increment might be for contractual commitments for the *Freedom Tower shell structure including its utility infrastructure* and finished space only for occupants to establish *a set of initial functions* [Unqualified Audit Opinion and Total Personnel Visibility].
  - Increments 2 and 3 (or more) would cover finishing customer space for the *other tenants* [Domains; stakeholders] providing additional functions in two (or more) groups.

- Note that each Increment may be divided into three phases:
  - Architecture (2) development and transition planning including initial BPR and BPM activities
  - Systems level BPR and BPM, acquisition and implementation of the architecture (1)
  - Sustainment and continuous improvement
- Note that at each step in the described activities, changes may be required in previously built Increments to accommodate other activities or new capabilities.
  - The governance process assures that this occurs in an orderly and effective manner.
  - This is part of the healthy evolution that an enterprise architecture enables.

- Finally, what is described here is properly called a "federation."
  - The GIG itself federates the Warfighting, National Intelligence, and Business Enterprise Mission areas.
  - The federation is possible because the GIG defines the Technical Infrastructure (and the National Intelligence Technical Infrastructure), including the Transport, Computing Infrastructure, and Core Enterprise Services Domains at the (controlled) unclassified and at the several classified levels.
  - Within the BEA each of the several business Domains represent federated entities of the Business Enterprise Domain conforming to the rules (as adjudicated within the Governance process) of the BEA.
  - And within each business Domain the various functional entities in each of the Services and Components themselves represent federations at another level, all conforming to the BEA.
  - Note that the roles of BMSI and the several Domains are different in the three phases
    - Phase 1 is a fully shared cooperative activity between BMSI and the several Domains.
    - Execution of Phases 2 and 3 are primarily the responsibility of the components within the Domains.
    - In Phases 2 and 3 the Domains maintains oversight over the developments by their components so as to be consistent with the evolving BEA facilitates cross-Domain consistency.
    - In Phases 2 and 3 BMSI maintains oversight over the DoD-wide BMMP and maintains the evolving DoD DODAF BEA to represent the "as built" BEA.
  - The BMMP governance structure guaranties the orderly resolution of problems that may arise.

BMMP Strategic Plan Suggestions

During the summer of 2004, the BMMP Director had assembled a group of about six people to develop a "strategic plan" for the BMMP. This group included Drew Miller, representing the Programming, Planning, Budgeting and Execution (PPB&E) Domain, and Scott Comes, representing the Program Assessment and Evaluation (PA&E) office. Miller was at that time the primary proponent of an ERP approach, while Comes was one of several federation proponents.

The briefing included here summarized the arguments of the two proponents. It also included in the last four slides IDA's comments on the two sets of arguments.

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BMMP STRATEGIC PLAN SUGGESTIONS

[Includes Comments on Presentations by Comes and Miller]

Institute for Defense Analyses

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BMMP Background (Outline only — TBD)

- History
  - Raison d'etre
  - Origin
- Business Version of JV 2020
- BMMP
  - Vision
  - Mission
  - Goals/Increment Focus
- Accomplishments to Date
  - Governance structure
  - BEA 2.1 (soon to be 2.2)
  - EBPM
  - Maturation of Domain Owners – BMSI relationship

Important Aspects of BMMP

- Enormously Difficult
  - Complex and dynamic multi-facetted "program" spanning all business related functions of the DoD
  - Is "Joint" both horizontally and vertically
  - Requires changes in processes, approaches and culture
  - Executed at a scale not here-to-for encountered
- Very Expensive
  - Many thousands of systems to be upgraded/replaced
  - Extant systems have cost in the tens of billions
  - BMMP instantiation will have similar costs
    - Resulting in much lower O&M costs
    - Resulting in enormous decreases in operating personnel costs

The Stakeholder Problem

- Stakeholder Community Permeates DoD from Top to Bottom
- Primary Active Stakeholders Include:
  - BMSI: Responsible for coordination, maintenance, evolutionary direction and oversight of the program
  - Domains: Responsible for evolutionary direction, coordination, and oversight of the systems and applications within their jurisdiction
  - Components (Services and Defense Agencies):
    - Through the PEOs and PMs responsible for instantiation of the systems and products for the transformation to the "to be" architecture
    - Within the components the CIOs and the evolving BMSI-like entities provide the internal coordination and interface to the Domains and BMSI
- The Problem: A well articulated and widely disseminated enterprise level description of the major functions encompassed by the BMMP, the various stakeholders, and what roles each is expected to take in the attainment of the BMMP goals is lacking
  - Use the 5 level Baseline graphic to guide in defining the boundaries and responsibilities of stakeholders within each Baseline oval

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Important BMSI Responsibilities — In Coordination with Active Stakeholders

- Define and widely promulgate the BMMP vision and achievable milestone goals with strategies to attain them near, mid, and long term
- Define and respect the appropriate roles and responsibilities of the various stakeholders
- Facilitate the effective interactions between the stakeholder entities, including BMSI, the Domain Owners, and the Components including the PEOs, PMs, CIOs and BMSI-like organizations
- Facilitate the assembly of the systems inventory and more formal portfolios by the Domains and Components
  - Coordinate Portfolio Management activities of the Domains and Components
- Develop and document the Enterprise level architecture model based on the end-to-end "Enterprise Business Process Model" (EBPM) perspective
  - Assemble and serve as the repository of the architecture products developed by the Domains and Components for the business functional systems to be instantiated, thereby defining the BEA

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Important BMSI Responsibilities — In Coordination with Active Stakeholders (Cont'd)

- Develop a transition planning template and an enterprise level transition plan
  - Assemble the Domain and Component transition plans and prepare a Transition Plan document spanning the BMMP transition planning
  - Update the Transition Plan document as the BEA evolves
- Coordinate the development of a data strategy consistent with the GIG Net-Centric Data Strategy
  - Define a data management approach, including the assignment of "data ownership," carrying responsibility for
    - Accuracy
    - Reliability
    - Access control
    - Integrity
    - Availability

Suggested Key Strategies

1. Mature and apply appropriate Governance process at all organizational levels
2. Establish an enterprise architecture of common capabilities and processes crossing Domains, and adopt Domain architecture for Domain unique capabilities and processes
3. Establish programmatic and budgeting priorities for Business Transformation within an integrated PPBE process incorporating PfM
4. Develop a data strategy; establish unambiguous data definitions and meta-data, and coordinate rules and criteria for data ownership, use, modification, persistence, etc. in the context of associated communities-of-interest processes
5. Develop and coordinate Domain and Component acquisition and implementation approaches for product solutions; collaborate and incorporate into a transformation roadmap

Suggested Elements of the Governance Strategy

- Establish additional Governance structures modeled after the streamlined processes currently in place for issues between Domains and BMSI
  - Permit quick identification and analyses of issues
  - Provide for cross functional issue resolution below the Domain level (e.g., Component, Agency or Program)
- Develop provisions for addressing enterprise issues that:
  - Cross functional areas within Components or Agencies
  - Cross functional and Domain areas between Components and Agencies
  - Take cognizance of OMB and FEA requirements being addressed by BMMP

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Suggested Elements of Architectural Development Strategy

- Identify and differentiate activities that must be performed in sequence as well as those that may be performed in parallel
- Collaboratively develop plans for BMSI, Domains, and Components
  - Focus on common capabilities and processes crossing Domains as appropriate
  - Domains responsible for their unique capabilities and processes
- Establish pragmatic WBS and workflow leading to objectives
  - Complete end-to-end process modeling (OV6c)and requirements tracing
    - Next iteration of the OV7 will focus on Financially Relevant data objects, activities will then need to establish an integrated OV7 for the revised OV6c
    - Update BEA products to match completed OV6c (e.g., OV6c→OV5, SV4 …)
  - Collect and put in common format all Domain BEA products as needed for cross Domain reviews
    - Identify gaps, overlaps, cross Domain issues
    - Document agreements and where necessary exercise governance process
  - Develop cross Domain process for establishing system migration investment strategies by increments (e.g., SV8)
  - Establish sustainable infrastructure for support, maintenance, change control, etc

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Suggested Elements of an Integrated PPBE Strategy Using PfM and BEA Products

- Identify what realistically should be used by Program Offices, Components, Domains for PfM activities in a variety of situations:
  - Availability of agreed to "to-be" BEA products (e.g., no SV at this time?)
  - Consideration for when and if legacy "as-is" architecture products are available, and the approaches to be taken under different situations
  - Definition and knowledge regarding touch points and event triggers for legacy systems and processes
  - Definition and knowledge of temporal aspects of touch points and event triggers in order to resolve UAO and material weaknesses
  - Levels of requirements tracing and Data Object definitions needed for specific assessments (e.g., presently only for financially relevant AA&V, personnel visibility; more work needed for other Domain areas)
- Too big an effort across DoD to have false starts; increase confidence in desired results by conducting trial/prototype assessments
- Develop an approach that permits the consolidation of similar review processes – make the process as productive as practical

Suggested Elements of Data Strategy

- Develop an integrated Logical Data Model (OV7) with unambiguous definitions across Domains
- Establish rules and criteria for data ownership, use, modification and update, persistence, etc in the context of where identified in the EBPM by the AIT workshops
- Enter Data Element definitions in the XML Data Registry
- Based on the "to be" SV-4s and -5s, define operational requirements from a systems perspective to access, share, distribute, archive, warehouse, or otherwise read, write, create, and dispose of data – from these perspectives develop the specific data storage requirements
- Identify essential provisions needed to be compatible with the yet to be implemented GIG Net-Centric Data Strategy

Suggested Elements of Acquisition Strategy

- Identify and establish enterprise capability needs consistent with the completed End-to-End process model (OV6c)
  - Both existing capabilities and gaps to achieve enterprise processes
  - Establish and coordinate Domain and Component priorities and timelines for achieving specific capabilities
  - Feed results into the appropriate PPBE and related PfM processes to establish program plans, alternative solutions, acquisition plans, etc.
- Coordinate and establish lead and support roles for program mods, new starts, etc. that cross Domain, Agency or Component responsibility boundaries
- As part of PPBE and related PfM processes periodically review acquisition strategies, implementation architectures and data strategies for compatibility with the BEA and GIG at appropriate levels (Enterprise, Domain, Component)
  - Domains develop and coordinate integrated implementation roadmaps based on Component inputs
  - Components coordinate and develop acquisition and implementation plans for system solutions, modifications, or outsourcing alternatives along with appropriate integration and testing
- Conduct additional BPR as appropriate, once a product is selected
  - Proposed architectural variances require petition through appropriate governance processes
- Develop a transformation roadmap and phased implementation plan incorporating Domain inputs

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IDA Commentary on Approaches by Miller (M) and Comes (C)

- Agree with M and C that not all formal DoDAF products are necessary
  - Agree with C that EBPM provides framework adequate for Domain to work with Components to plan and build solutions
  - At (DoD) enterprise level need only drill down to level adequate to define cross Domain touch points
  - Further architecture detail is a Domain and Component role
- Agree with C on PfM by Domains requires a good, well documented understanding of processes, shortfalls, and systems
- Agree with C on a "confederation" of appropriate functional area solutions, composed of
  - Vertical elements ("stovepipes")
  - Single Domain-wide integrated elements
  - Cross Domain elements
  - Any mix of above (could be single ERP e.g., M's approach; a DoD family of ERPs e.g., M's "fallback" approach; or many solutions including multiple ERPs e.g., C's approach)

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A Problem With Definitions

Many of the problems inhibiting optimum progress in BMMP is the lack of a good lexicon of the several technical terms that have different meanings to different stakeholders, e.g.

- Architecture
  - (C) "a representation of plans, processes, strategies, etc. for accomplishing an objective"
  - (M) " a blueprint"
  - (Compliance) the specific formal views of the DoDAF
- Integrated
  - (M, Executive DoD) a seamlessly integrated suite of systems, implicitly with a uniform data organization
  - (C) accepts a "federated" (or confederation) set of (lesser enterprise) systems organized along both horizontal and vertical lines (including "stovepipes")
- Capabilities / Processes
  - (C) uses "processes" in his briefing but claims that they are synonymous with "capabilities"

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(C) Summary of way ahead [IDA Comment]

- Architecture
  - Reach consensus on appropriate level of detail for "top level" BEA
  - Adjust BMSI / IBM direction and workload (and workforce) accordingly
  - Evaluate future direction and workload for EBPM effort (after Increment 1)
  - Develop clear understanding of roles and responsibilities for cross-domain integration
- Portfolio Management
  - Continue to develop Domain process models to ensure Domains are equipped to conduct Portfolio Management
  - Evaluate success/failure of preliminary Portfolio Management in Program Review
  - Adjust Portfolio Management approach as needed
  - [May not be able to achieve uniform PfM approach to accommodate LOG Domain]
- Endorse, then improve BMMP "Solution"
  - "Confederation" of "stovepiped" solutions for functional areas
  - Align solutions along Services and Agencies, based on Domain processes
  - Upfront recognition of need to link within and across Domains
  - Commonality of solution where possible
  - Develop, expand Enterprise Integrated Data Environment; "net centric" data solution in long term

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IDA Comments on M's Solution Approach

- Agree with M's "fallback position" on C's "Summary of Way Ahead"
  - Use ERP family mix for Component "stovepipe"
- Disagree with M's comment that "Without a Common ERP Backbone – BMMP will very likely fail"
  - It will not be possible to gather enough coherence within DoD for such an acquisition; the "fallback" approach with multiple ERPs or the "confederation" approach will work
- Accept "fallback" position to allow for "different ERP implementations by Components, but the same ERP family mix"
  - Probably the "family mix" will include the 3 or 4 primary ERP vendors
  - As is always the case, there will be the occasional need for outside the "family mix" of COTS or GOTS packages to accomplish some capabilities
- Even with a basic ERP solution there will be a need for middleware to connect legacy program elements and databases to the evolving BMMP – for many years to come

A Federated Approach to Integration Necessary for BMMP Success

This briefing was produced initially for the "strategic plan" group to find an approach that would allow for a number of ERP solutions that would work in a federated mode, thereby bridging the differences between the unitary ERP and federated approaches. It had the effect of convincing a number of senior participants that the federated approach was the one to be endorsed. In addition to presentation to the "strategic plan" group, this briefing was presented to a number of the senior line managers, including the BMMP director and the BEA chief architect.

A Federated Approach to Integration Necessary for BMMP Success

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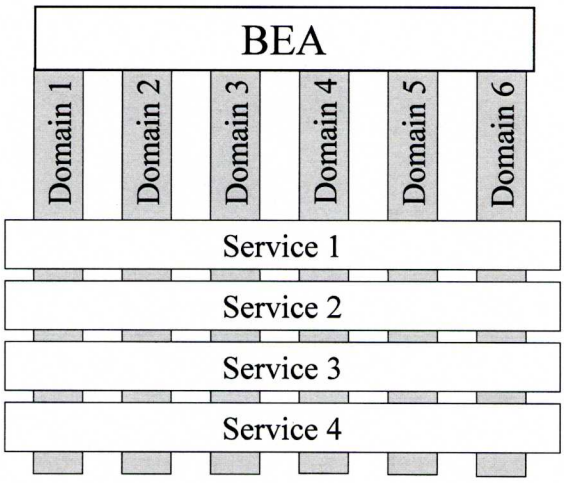
DoD Organizational Reality

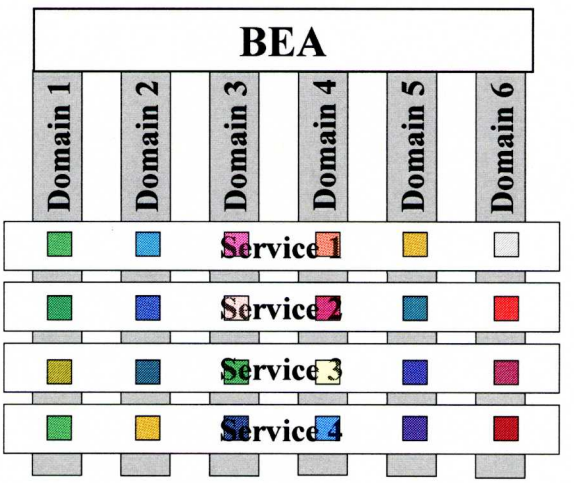


Important Aspects of BMMP

- Enormously Difficult
  - Complex and dynamic multi-facetted "program" spanning all business related functions of the DoD
  - Is "Joint" both horizontally and vertically
  - Requires changes in processes, approaches and culture
  - Executed at a scale not here-to-for encountered
  - Many thousands of systems to be upgraded
- The Stakeholder Problem
  - Stakeholder community permeates DoD from top to bottom
  - A well articulated and widely disseminated enterprise level description of the major functions encompasses by the BMMP, the various stakeholders, and what roles each is expected to take in the attainment of the BMMP goals is lacking

Current Legacy Approach

(Problems With Interoperability)



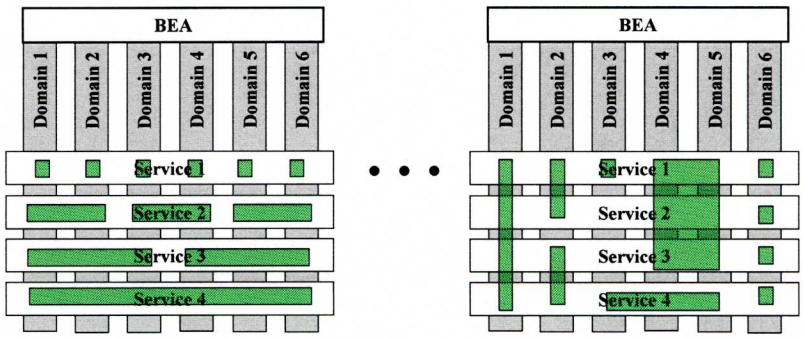
Federation (Confederation)

- Definition: An approach that allows a number of autonomous organizational entities to participate in the development of an architecture while retaining a level of internal independence
- Interoperability amongst the federated entity architectures is achieved with explicit definitions and oversight established at the enterprise level of
  - Standards for data, processes and protocols
  - Entity roles and responsibilities
  - Scope of actions and control
- Example: The GIG is a federation of 3 entities, following such a set of definitions and using the common set of Net-Centric Core Enterprise Services – the entities are:
  - Warfighting Mission Area
  - Business Mission Area
  - National Intelligence Domain

A Data Strategy is Required

- Coordinate the development of a data strategy consistent with the GIG Net-Centric Data Strategy
- Develop an integrated Logical Data Model (OV-7) with unambiguous definitions across Domains
  - Enter Data Element definitions in the XML Data Registry
- Establish operational requirements from a systems perspective to access, share, distribute, archive, warehouse, or otherwise read, write, create, and dispose of data
- Establish a data management approach, including
  - Definitions of data and meta-data descriptions
  - Data transfer protocols
  - Defined rules and criteria for data ownership, use, modification, persistence, etc.
- Assign "data ownership," carrying responsibilities for:
  - Accuracy
  - Integrity
  - Access control
  - Reliability
  - Availability

BMMP Federated Solution Options



Option 1 Option n

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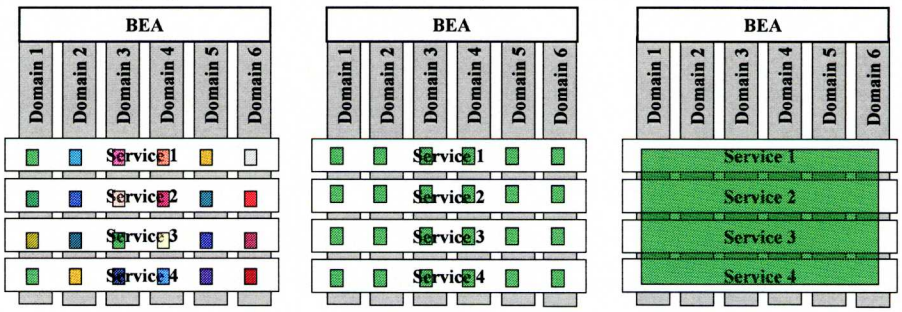
BMMP Evolution

Current Legacy Solution Initial Federated Solution Totally Integrated Solution



Long Term Evolution

- **The evolution roadmap will, by necessity, follow a path of federated solutions**
- **Unlikely total integrated solution will ever be achieved, and probably undesirable**
- **Approach accommodates changing requirements, environments and technologies**
- **Approach accommodates incremental evolution and options nearly unlimited**

9/1/04

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July 2004 Comes / Miller "Debate"

Comes Way Ahead Summary (July 12, 2004)

- Endorse, then improve BMMP "Solution"
  - "Confederation" of "stovepiped" solutions for functional areas
  - Align solutions along Service and Agencies, based on Domain processes
  - Upfront recognition of need to link within and across Domains
  - Commonality of solutions where possible
  - Develop, expand Enterprise Integrated Data Environment; "net-centric" data solution in long term

Miller's Solution Approach

- Although preferred position is that "Without a Common ERP Backbone – BMMP will very likely fail"
  - A "fallback" position is accepted to allow for "different ERP implementations by Components, but the same ERM family mix"
  - Probably the "family mix" will include the 3 or 4 primary ERP vendors
  - ***This can only work with federated rules (AB)***

A Federated Approach to Architecture Development

This short paper is a revision by IDA of an extended definition of a federated approach to architecture development for the group responsible for the Enterprise Transition Plan. Among other issues the alignment of the architecture development along DoD organizational lines is explicitly discussed.

A Federated Approach to Architecture Development

A federated approach to architecture development allows a number of autonomous organizational components to participate in the development of an architecture while retaining a level of internal independence. To make such an approach work, there must be appropriate principles of federation established as part of the overall governance process for architecture development.

There are two primary ways that the autonomous organizational components can participate in the architecture development as part of a federated approach (as opposed to just becoming team members of a single team developing the architecture). The first involves a partitioning of the architecture into parts that fall under the control of designated organizational units, allowing them to develop this part of the architecture subject only to a set of framing constraints established at an enterprise level. The second more loosely organized approach, involves another independent development model based on that used in open source development projects. Anyone may develop parts or aspects of the architecture and submit them for inclusion in the architecture. The first approach is more appropriate to the purposes and goals of BMMP and is discussed in greater detail here.

In this approach autonomous organizational components independently develop architecture products that will produce interoperable component implementations as part of the overall business system. The key to achieving such independent but coordinated development is an appropriate approach to the standards and processes of such architecture product development, the appropriate layering and decomposition of the overall architecture into component scopes that can be effectively tackled on an independent basis, and a governance and compliance mechanism that can assess the resultant architecture products for level of compliance and quality so as to assure the ultimate development of interoperable components of the ultimately implemented business system.

1 The standards and processes established for architecture development (DODAF and specific guidance on using DODAF, for instance, as well as Popkin SA usage standards) ensure that appropriate architecture products are developed, and that they are mutually understandable by all organization elements involved.

2 Appropriate layering and decomposition allows the overall framing of an Enterprise Architecture, with clear identification of component elements that need not necessarily be visible at the overall level, allowing effective independent development of the architecture of such component areas while ensuring interoperability between the various component parts. The interoperability of the various components of the federation are ensured with the explicit definitions at the enterprise level of

- standards for data, processes, and protocols

- entity roles and responsibilities

- scope of action and control

Such an approach allows the components to be parts of a monolithic or a distributed or federated architecture.

3 Interoperability across the enterprise is ensured by the various components developed according to the architecture actually being compliant with the relevant standards and protocols. Part of the governance effort is a compliance checking or certification capability. Such compliance certification should be at two major levels: one for the architecture and design products developed by the autonomous organizations, and a second for the actual component implementations, to ensure that they operate as required and designed, and meet minimum performance, security and safety levels.

The Business Management Modernization Program (BMMP) -- Business Modernization and Systems Integration(BMSI) -- manages and focuses development of BEA in accordance with decisions, direction and oversight provided through the BMMP governance structure [Under SecDef Memo, "Domain Owners Integration Team for BMMP" September 15, 2003]. In this context, the following describes BMMP Federated Architecture controlled roles and responsibilities (Source material: April 2004 CONOPS).

Note: The use of the term "component" here may too easily be confused with the DoD term "Component", meaning the Services and Agencies. We may have to find another term.

A. Brenner
10/05/2004

High Level Concept of Operations for Federated Approach to Architecture

This briefing was prepared for Paul Brinkley USD(AT&L) and Tom Modley USD(C), the recently appointed OSD level individuals jointly responsible for DoD Business Mission Area transformation. At the request of the director BMMP, IDA had started developing a Federated Architecture CONOPS at the end of 2004. This briefing was designed to share the thinking on the matter with the senior participants.

HIGH LEVEL CONCEPT OF OPERATIONS FOR FEDERATED APPROACH TO ARCHITECTURE

February 22, 2005

PREFACE, OBJECTIVE and VISION

- PREFACE
  - NDAA requirements
- OBJECTIVE
  - Business transformation to better support the Warfighter and modernize its business management processes
  - Requirements for a business enterprise architecture (BEA) and a business transition plan (BTP)
- VISION
  - Recognition of DoD organization, history, culture and Public Law leads to a need for a federated approach to accomplish business transformation
  - Federated approach makes possible the development of a BEA and BTP

DEFINITIONS

- **ENTERPRISE ARCHITECTURE**
  - NDAA definition
- **FEDERATION**
  - BMA is a member of the GIG (a federation)
  - BMA federation members include
    - OSD entities
    - Joint Staff
    - Military Services and Agencies
    - Business domains
    - Combatant Commands
- **FEDERATED ARCHITECTURE**
  - "An approach for enterprise architecture development that is composed of a set of coherent but distinct entity architectures — the architectures of the separate members of the federation."
- **HIERARCHICAL ENTERPRISE ARCHITECTURES AND TRANSITION PLANS**
  - BEA-BMA (BTP-BMA) is the guiding framework; NDAA September 2005 delivery
  - BEA-xxx (BTP-xxx) is the EA (TP) for federation member xxx
  - BEA (BTP) is composite EA (TP) encompassing all levels of the federation

BACKGROUND, PURPOSE AND SCOPE

- BACKGROUND
  - Current status of BMA information systems
    - OMB, Congressional and GAO positions
  - Argument for federated approach for transformation
  - NDAA mandated governance structure summary
    - Additional organizational structure
  - NDAA mandated deliverables
    - BEA-BMA and BTP-BMA
- PURPOSE
  - High level CONOPS for federated approach
- SCOPE
  - Covers all DoD business systems and the capabilities and processes supported by these systems

KEY FEDERATED ARCHITECTURE OPERATIONAL PRINCIPLES

- BMA business system implementations support interoperability and integration by sharing data and BMA-Services across the federation and other GIG mission areas
- BEA and BTP are aggregations of EAs and TPs of all federation members
  - Documents business and financial rules and policies, activities, functional processes, roles and data objects and strategies; defines migration path
  - Provides integrated view of BMA, facilitating BPR and portfolio management
- BEA-BMA and BTP-BMA document the common rules to guide architecture and TP development by all federation members
- COIs to be established to address organization, data and BMA-Services issues
- As Business Transformation proceeds
  - Redundant less effective legacy systems will be retired
  - Opportunities for reuse of generic products will grow
- Multiple levels of organizational hierarchy are to be accommodated including
  - From DoD enterprise to Dod Programs
  - DoD commercial partners and other USG agencies

KEY RESPONSIBILITIES FOR FEDERATED ARCHITECTURE OPERATIONS

- DBSMC, working through AAs and working groups, with support of Components/Agencies and OBT (BTRA)
  - Develop BEA-BMA and BTP-BMA
  - Establish rules of federation, and BEA and BTP consolidation
  - Define time-phased milestones and performance metrics
  - Identify financial and non-financial resource needs
  - Develop a process for establishing COIs
- AAs working with their IRBs have full responsibility for defense business systems under their jurisdiction
- IRBs review all defense business systems under their jurisdiction
  - At least annual review of all defense business systems
  - Ensure consistency with DBSMC guidance
  - Approval as an investment before funds obligation
- Components/Agencies and CBM leaders
  - Develop their mission oriented architectures and transition plans
  - Ensure the architectures and transition plans result in proper implementations
- OBT (BTRA) supports all elements of the BMMP
  - Assess submissions for compliance with federation, technical and policy issues
  - Develop, consolidate and maintain the BEA and BTP
  - Evaluate architectural variances and cross-mission conflicts
  - Maintain the several registries

High Level Concept of Operations for Department of Defense Business Management Modernization Program Federated Approach to Architecture and Transition Plan, Development, and Maintenance

This paper was developed by IDA at the request of the director BMMP, starting at the end of 2004 over a four month period. Partly because of the changing organizational structure of the BMMP that was ongoing simultaneously, this paper necessarily underwent a number of revisions so as to keep it aligned with the evolving organization. The organizational changes were made in response to directives by Congress in the National Defense Authorization Act of 2005.

On April 20, 2005 version 13 of the CONOPS was delivered to the BEA chief architect for further refinement and distribution. The then chief architect retired shortly afterwards and her replacement did complete refining the CONOPS by July 1. Since that time, yet another individual has been appointed chief architect, and the refined version of the CONOPS has yet to be coordinated and distributed.

Annex B

HIGH LEVEL CONCEPT OF OPERATIONS FOR DEPARTMENT OF DEFENSE BUSINESS MANAGEMENT MODERNIZATION PROGRAM FEDERATED APPROACH TO ARCHITECTURE AND TRANSITION PLAN, DEVELOPMENT AND MAINTENANCE

PREFACE: The Business Management Modernization Program (BMMP) was established in 2001 for the purpose of modernizing the Department of Defense's (DoD's) business information systems in order to meet business management goals. The BMMP was implemented by the Business Modernization and Systems Integration (BMSI) office which focused on the development of a comprehensive information systems architecture—the Business Enterprise Architecture—for DoD's Business Mission Area (BMA). That effort was only partially successful. The National Defense Authorization Act (NDAA) for FY2005 is the congressional mandate to DoD to continue with the BMMP but under closer DoD oversight. It requires DoD to develop a business enterprise architecture and an attendant business transition plan for the business management information systems specified by that enterprise architecture by September 2005.

1. **OBJECTIVE:** The Secretary of Defense has committed to improve the performance of the DoD Business Mission Area to more effectively support the Warfighter and to modernize its business management processes. A Business Enterprise Architecture (BEA) and a Business Transition Plan (BTP) are required to drive the necessary business transformation to accomplish these goals. Together these will provide an architecture and a roadmap leading to an attainable business solution interoperability, which satisfies the mission needs across DoD for the transformation to optimize support for the Warfighter.

2. **VISION:** DoD will effectively support the Department's transformation efforts in support of the Warfighter by taking a federated approach to develop and maintain an architecture and a transition plan to guide modernization of the BMA. Taking cognizance of the realities of how DoD is currently organized, a consequence of history, culture, and changing Public Law, this federated approach is an effective way to bring about the desired business transformation. It allows for a number of heterogeneous organizations, both peer and hierarchical, to develop and maintain a BEA and an associated BTP, providing an integrated view of the DoD BMA modernization effort that permits organizations and entities to retain a dedicated focus on mission specific solutions and achieve overall BMA transformation goals and objectives.

3. **PURPOSE:** This document provides a high-level concept of operations (CONOPS) view for a federated approach for the development and maintenance of the BEA and the BTP, including considerations for mission and technology change and evolution. It also identifies the organizational responsibilities and the associated accountabilities.

4. **SCOPE:** The BEA and the BTP encompass all BMA architecture initiatives and implementation transition planning at all functional levels, and covers all DoD business systems and the functions and activities supported by such systems. The BTP includes all the corresponding solutions for implementing the BEA.

5. **DEFINITIONS:** Many information technology (IT) related terms are used without clear definitions as to their meaning, opening opportunities for misinterpretation of the intended meaning. To minimize misinterpretation, some of the more problematic terms are defined here. Other IT terms are defined in the attached Glossary.

Enterprise Architecture (NDAA definition[4])

"(A) means--
(i) a strategic information asset base, which defines the mission;
(ii) the information necessary to perform the mission;
(iii) the technologies necessary to perform the mission; and
(iv) the transitional processes for implementing new technologies in response to changing mission needs; and
(B) includes--
(i) a baseline architecture;
(ii) a target architecture; and
(iii) a sequencing plan."

Federation [5] – An organizational entity composed of smaller organizational divisions united to achieve a common goal, within which the smaller divisions retain for themselves control over local matters.

The BMA is a member of the larger DoD Global Information Grid (GIG) federation. The GIG federation also includes the Warfighter, Intelligence Community, and Enterprise Information Environment Mission Areas. Within the BMA, the enterprise federation members include the four BMA Approval Authority entities (see Section 6.d. below), and the Military Services and Agencies. Within each of these organizations there likely will be additional levels of federation.

Federated Architecture – An approach for enterprise architecture development that is composed of a set of coherent but distinct entity architectures; the architectures of the separate members of the federation.

With this approach the members of the federation participate to produce an interoperable, effectively integrated enterprise architecture. The federation sets the overarching rules of the federated architecture, defining the policies, practices and legislation to be followed,

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[4] "The term 'enterprise architecture' has the meaning given that term in section 3601(4) of title 44, United States Code."

[5] The definition is a composite from two respected dictionaries: Webster's Third New International Dictionary, Unabridged (Merriam Webster, 1986); and Encarta® World English Dictionary (Bloomsbury Publishing, 2004).

as well as the inter-federate procedures and processes, data interchange, and interface standards, to be observed by all members of the federation. Each federation member conforms to the enterprise view and overarching rules of the federation, in developing its architecture. Internal to themselves, each focuses on their separate mission and the architecture that best supports that mission.

Hierarchical Architectures and Transition Plans[6]

Within the BMA federation there is a single DoD-wide business enterprise architecture and a number (~35) of Component[7] business enterprise architectures, reflecting Component –specific capabilities. There is also a guiding framework accommodating the common capabilities, data standards, rules, and the operating requirements that are DoD-wide. Figure 1 illustrates the BMA enterprise level of architecture. Federated elements within any of these enterprise federation members, obey the rules of their federation parents and are not designated as "enterprise."

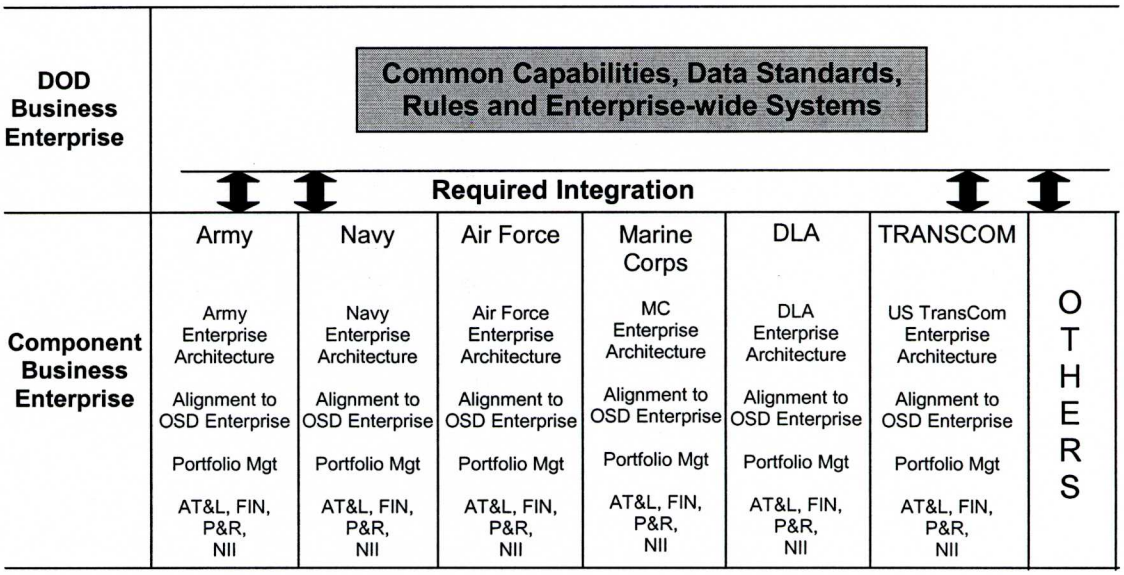

Figure 1. Defense Federated Business Enterprise Environment

To distinguish the various levels of the federated approach to develop the BMA enterprise architecture and transition plan, the following designations are assigned:

- BEA-BMA represents the guiding framework for all BMA business enterprise architecture. It is sufficiently defined to effectively guide, constrain, and permit implementation of interoperable defense business systems solutions. It is the topmost level of BEA-DoD.

[6] Here and elsewhere in this CONOPS, the term "transition plan" at the enterprise level is to be understood to be the "Enterprise Transition Plan and Program Baseline."

[7] Here and elsewhere in this CONOPS, Components (capital C) means the Military Departments/Services (Army, Air Force, Navy, Marine Corps) and the Defense Agencies.

- Corresponds to the NDAA definition for September 2005 delivery[8]

- BTP-BMA represents the guiding framework for all BMA business enterprise transition planning and the implementation strategy for new and modified systems. It addresses the acquisition strategy for systems that are expected to be needed to complete the defense business systems transformation.
  - Corresponds to the NDAA definition for September 2005 delivery[9]
- BEA-DoD is the enterprise architecture of the DoD-wide federation. It includes the BEA-BMA and integrates enterprise architecture information for all the Core Business Mission Areas (CBMA), their reporting extensions, and the BMA oriented services extensions, designated as Business Enterprise Services (BES), not included in the Net-Centric Enterprise Services (NCES) provided by the ASD(Networks and Information Integration)/DoD CIO[10].
- BTP-DoD-xxx is the transition plan for DoD OSD entity xxx, which owns and manages business information systems that support work for which the entity is responsible. This includes each Core Business Mission and other OSD entities as appropriate.
- BEA-yyy is the enterprise architecture of Component federation member yyy.
- BTP-yyy is the transition plan of Component federation member yyy.
- BEA represents the composite BMA enterprise architecture encompassing all federation members.
- BTP represents the composite BMA transition plan encompassing all federation members.

6. BACKGROUND:

a. The current status of the information systems supporting the Department's BMA has been called into question on numerous occasions by Congress, the Office of Management and Budget (OMB), and the Government Accountability Office (GAO). The current information technology systems supporting the BMA have been growing and expanding for decades without an overall Department-wide plan or enterprise-level guidance. The Secretary of Defense (SECDEF) made it one of his priorities to rectify these deficiencies and the development of the BEA, along with the corresponding BTP, is a major step in that effort.

b. The BEA-BMA provides the Department with the end-to-end architectural perspective of BMA functions and processes. It includes the necessary information infrastructure to ensure interoperability within the BMA and across the Warfighter and Intelligence Mission Areas and is supported by the underlying Enterprise Information Environment (EIE) Mission Area.

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[8] Additionally the delivery to Congress will include an initial set of Component and DoD-wide architecture products associated with current BMA transformation activity.

[9] Additionally the delivery to Congress will include an initial set of transition plans delineating current BMA transformation activity.

[10] Hereafter designated as NII/CIO here.

c. A federated approach[11] to architecture development most easily accommodates the diverse functions and missions of the Department and allows an orderly and phased execution and modernization of the thousands of systems that currently support the Departments' diverse functions and missions. This approach provides a coordinated hierarchy of enterprise architecture elements capable of supporting the implementation of solutions and the associated transition planning to achieve the envisioned modernization goals and objectives.

d. The NDAA provides for a governance structure vested in the Defense Business Systems Management Committee (DBSMC) to exercise oversight and approval of defense business systems modernization activities. Accountability for the various defense business systems is assigned to four principal members of the DBSMC (i.e., USD(AT&L), USD(C), USD(P&R), and ASD(NII)) — the Approval Authorities (AAs). Each AA is required to establish an Investment Review Board (IRB) with responsibility to review defense business systems under its jurisdiction, with a total cost in excess of $1M, as a sound investment consistent with the guidance from the Secretary of Defense and the DBSMC. Additional organizational structure is proposed to support these including:

   i. Office of Business Transformation (OBT) which includes:

      - Transformation Support Office (TSO) – the evolution of the BMSI office – to support all aspects of the DoD business transformation effort
      - BMMP-PEO for DoD Enterprise Programs with responsibility for development of systems assigned to the DoD-wide federation;

   ii. Five Core Business Missions (CBMs) are also defined, represented by a PSA Under Secretary and in some cases jointly with a flag-rank Warfighter, linking the BMA and the Warfighting Mission Area (WMA), and driving the DoD business transformation.

e. The Secretary of Defense, acting through the DBSMC, is required by the NDAA to develop:

   i. "An enterprise architecture to cover all defense business systems, which shall be sufficiently defined to effectively guide, constrain and permit implementation of interoperable defense business system solutions consistent with the policies and procedures established by the Director of the OMB; "

   ii. "A transition plan for implementing the enterprise architecture for defense business systems."

7. KEY FEDERATED ARCHITECTURE OPERATIONAL PRINCIPLES:

a. The DoD BEA is an information infrastructure and a DoD strategic asset that defines the business processes of the Department to support its business missions. It is an

[11] Various governance styles and mechanisms can be used to manage and oversee business programs depending on the main business orientation of an organization. In the DoD, there is a need for an enterprise approach to business processes that cuts across organizational entities including OSD, JCS, the Military Services and Agencies, and for synergistic information systems to support them. Since existing DoD governance includes decision making processes largely done through executive committees, a federated approach to governance has been found both in government as well as private industry to best meet this need and condition.

enterprise architecture as defined in the NDAA, and it will be consistent with the Federal Enterprise Architecture, as represented by the DoD Reference Models.

b. BMA business systems solution implementations, conforming to the BEA, will experience interoperability and effective integration by adhering to the rules of the federation, which supports sharing of data and BMA oriented enterprise services, the BES, across the GIG mission areas and the various BMA federation members, by ensuring compliance with the following:

   i. A federated data strategy, which is an integral part of and compliant with the Net-Centric Enterprise strategy, as required by the NII/CIO, establishing guidelines for data and meta-data definition, data publishing, and subscription aided by discovery, mediation, and messaging;

   ii. Using GIG NCES that enables data tagging, sharing, searching, retrieving and information assurance; and

   iii. Data sharing that should be done in ways that preserve the meaning and relationships inherent in that data, without concern for technical details of *how* the data is created, stored locally, or used in any of the defense business systems. It should conform to the federation rules for data accuracy, reliability, and timeliness and for data ownership, stewardship, use modification, persistence, access, security, and interchange, and make all data accessible to authorized Department users and other Government and non-Government communities, including both anticipated and unanticipated users and applications;

   iv. BES support interoperability in compliance with the Net-Centric Operations Warfare (NCOW) Reference Model (NCOW-RM) and the Net-Ready Key Performance Parameters, as defined by the Chairman Joint Chiefs of Staff (CJCS) Instructions; and

   v. A governance process established by the DBSMC for the federated approach to architecture development, maintenance, update, consolidation, usage, and the necessary procedures for the effective performance and activities of the federation. The DBSMC governance will also ensure that these procedures are reviewed, modified, followed, and evaluated for compliance.

c. The BEA and the BTP are an integration of the architectures and transition plans of all of the federation members. Moreover, the architectures and transition plans of each of the enterprise federation members, (e.g., the AAs, DoD-wide and Components), will also represent an amalgamation of those of supporting federation members, representative of the diverse spheres of business activity for which they have responsibility. Note, that both of these are evolutionary products that will change with time to accommodate to the continuously changing mission requirements, technology advancements and ongoing process improvements.

d. The development of the BEA at all levels of the federation is guided by the BEA-BMA, and:

   i. Facilitates effective business process reengineering (BPR);

   ii. Must accommodate bottom-up initiatives to find, define and resolve what may be initially evident as a local issue; and

iii. Architectural artifacts should only be developed to the extent necessary and as needed, avoiding architecture development just to develop architecture – called "just-in-time architecture."

e. The BTP defines how the Department will migrate from its current "As Is" inventory of business systems and operations to achieve the modernized "To Be" state documented in the BEA, which:

i. For the September 2005 delivery to Congress includes:

- Listing of business "legacy systems" (as of December 2002) that will not be part of the objective BEA, together with the schedule for terminating those systems that provides for reducing the use of those legacy systems in phases
- Listing of those legacy systems that will be a part of the objective BEA, together with a strategy for making the modifications to those systems that will be needed to ensure that such systems comply with the BEA-BMA.

f. The BEA along with the BTP enables informed decision-making and sound investment planning essential for effective DoD Portfolio Management (PfM). Additionally, they enable the traceability needed to determine the impact of changes to compliance rules, requirements, and process changes within and between business areas, thereby facilitating evolution of the BMA transformation.

g. The BEA-BMA documents the uniform and common DoD business enterprise reference rules, requirements and information infrastructure to guide the development of architectures by all members of the federation. This enables the federated approach to work by supporting architecture development by the diverse executing entity implementations to achieve the goals for business transformation, including:

i. Allowing for and accommodating the existence of a number of interacting homogeneous and heterogeneous organizations that operate at the same or different levels of either functional or organizational responsibility;

ii. Providing the executing entities within the governance structure with the necessary flexibility to instantiate the BEA in a manner that allows for mission specificity and the achievement of the required capabilities;

iii. Providing the procedures and rules for federating and consolidating the architecture and transition plans of lower levels up to the higher levels;

iv. Providing guidelines for the escalation of federated architecture, data strategy, BES, and transition planning issues through the defined governance process;

v. Providing an ontology and strategy such that the BEA will support the goals for interoperability and integration set forth by the NDAA, the NII/CIO guidelines and directives, and CJCS Instructions;

vi. Providing a Configuration Management (CM) process and Configuration Control Board (CCB) that allows for and encourages an orderly mission and technological evolution of the BEA and maintains an orderly and consistent identification of solution configurations, including architecture artifacts, software configuration items, hardware configuration items, and documentation throughout the life-cycle;

vii. Providing the necessary framework for the Core Business Mission leaders, AAs, and Components to establish their "To Be" vision, and to enable their functional process transformation, business system modernization, associated data and

services strategy, and support of their Portfolio Management, while ensuring the aforementioned DoD-wide goals in support of the integrated end-to-end missions of the Warfighting and Intelligence Community Mission Areas;

viii. Establishing a number of common BMA catalog and registry repositories[12], consisting of organized databases, containing the formal descriptors of all aspects of the BEA. Most of these will be logically enterprise-wide databases, although physically they may be distributed. These repositories will include among others:

- Rules of the federation, including system interface standards, processes, and procedures, both internal and external to DoD
- Appropriate DoD and federal policies and regulations
- DoDAF architectural products
- BMA reference models
- Architectural artifacts and transition plans at all levels of the federation
- Data and meta-data as defined by NII/CIO and BMA Net-Centric strategy
- BMA data authoritative sources
- BES, including the provider of those services
- Solution implementations as product or system candidates for reuse.

h. The BTP-BMA documents the requirements to guide the development of transition plans by all members of the federation.

i. While focusing on the Business Mission Area, the federated approach must accommodate and be inclusive of the functional data requirements, solutions, and services (e.g., *what* is needed) by other GIG mission areas.

j. A successful federated development and maintenance initiative requires a prudent layering and decomposition of the overall architecture into the appropriate levels (scope). The federated architecture initiative will be coordinated at the BEA-BMA level through the common application of procedures and standards throughout the federation, to enable the consolidation of architecture elements in order to achieve the established objectives and goals for the BEA. The interoperability of the solutions or systems as implemented by the various members of the federation, is ensured with explicit definitions at the enterprise level of, or included in:

- GIG policies, including NCOW-RM, Net Ready Key Performance Parameters, NII/CIO Net-Centric Enterprise strategy, and BMA Net-Centric Enterprise strategy
- Architecture component terms and definitions
- Standards for data, processes, and protocols
- Entity roles and responsibilities
- Scope of action and control
- Defined capabilities and supporting system functions

[12] For a more detailed list of and responsibilities for these repositories, see a briefing entitled "Managing & Developing Enterprise Architecture in a Federated Environment."

- Relationships between systems, defined functions, supported capabilities, and the BEA.

k. Communities of Interest (COIs)[13] will be established to address organization, management, data, and BES issues of specific interest to that particular community with the following characteristics:

   i. COIs are formed to solve a mission need and are comprised of all identified stakeholders. They may be aligned along a single functional need or may be cross functional. They are recognized entities, comprising both formally-sanctioned and ad hoc types that impact programs and organizations. Initially, the sanctioned COIs might include those aligned with each of the five Core Business Missions, the high priority CBM capabilities approved for near term implementation, and one COI representing collectively the IRBs;

   ii. It is important that the COIs are established with strong leadership and where appropriate should be tightly-connected to the appropriate AAs.

l. As the Business Transformation of the Department proceeds:

   i. Redundant and less effective legacy systems will be retired;

   ii. The new replacement defense business systems solutions implemented in compliance with the BEA will provide opportunities for reuse of certain common or generic implemented products. Potentially reusable components of products or solution products, characterized in terms of capabilities, are designated as "templates." [14] These templates will become available for use by other members of the federation, and are registered in the BMA template registry. The availability of these templates will facilitate reuse of relevant architectural components or of solution products, and provide faster and less costly implementation of business systems solutions across the Department;

   iii. All new solution initiatives will be required to search the BMA template registry for entries that may be appropriate solutions for the new initiative. These should be considered when preparing an Analysis of Alternatives (AoA) in support of the proposed solution.

m. The BEA federated architectural elements and transition plan will be developed, maintained, updated, consolidated, and implemented at all levels of the DBSMC-approved federation organizational hierarchy. It must accommodate the following levels of organizational hierarchy:

   - Business Mission Area
   - Core Business Missions
   - DoD-wide business Programs/Systems solutions (BMMP-PEO)
   - Components
   - Programs/Systems solutions

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[13] For policy statement regarding COIs, see "DoD Directive 8320.2, Data Sharing in a Net-Centric Department of Defense" (December 2, 2004).

[14] A "template" as used in this context means a description (architectural, capability, functional, etc.) of a working program, system or process that may have utility in areas outside that of the entity responsible for its instantiation.

- DoD commercial partners
- Other US Government Agencies.

8. KEY RESPONSIBILITIES FOR FEDERATED ARCHITECTURE OPERATIONS[15]:

a. The DBSMC, working through the AAs and the governance-established working groups, with the support of the Components and the OBT is responsible for:

i. Developing the BEA-BMA, that, at a minimum, will enable DoD to

- More effectively support the Warfighter
- Comply with all Federal accounting, financial management, and reporting requirements
- Integrate budget, accounting, and program information and systems
- Provide for the systematic measurement of performance, including the ability to produce timely, relevant and reliable financial information;

ii. Developing policies, procedures, data standards, and system interface requirements that are to apply uniformly throughout DoD by defining the rules of federation (see Section 7.b.), and documented in the BEA-BMA (see Section 7.g.);

iii. Developing the BTP-BMA, including specific time–phased milestones, performance metrics, identification of the financial and non-financial resource needs, and an acquisition strategy for new systems that are expected to be needed to complete the BMA transformation;

iv. Serving as the final arbiter to resolve or adjudicate any BMA federation issue as it relates to the BEA or BTP.

b. The AAs are responsible for the review, approval, and oversight of the planning, design, acquisition, deployment, operation, maintenance, and modernization of defense business systems under their jurisdiction through responsibility for:

- Business Enterprise Architecture
- Portfolio Management
- Transition Planning.

c. The IRBs, established by each of the AAs, have the responsibility to review all defense business systems for which the AA is responsible, with a projection of cost benefits and risks, including:

i. Review and approval as an investment before the obligation of funds on the system;,

ii. Periodic review, not less than annually, of every defense business system investment;

iii. Representation on each IRB by appropriate officials from among the Military Services, Combatant Commands, the Joint Chiefs of Staff, and Defense Agencies;

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[15] Note that this paper is an Annex to a larger paper addressing the wider governance issues for BMMP. For a more extensive discussion of responsibilities see the full paper.

iv. Exercise of a common set of procedures for:

- Ensuring an appropriate level of review within DoD
- Making certifications in accordance with the conditions for the obligations of funds
- Utilizing decision criteria, including standards, requirements, and priorities that result in the integration of defense business systems.

d. The COIs are responsible for:

i. Analyzing and resolving issues relevant to each community, including where appropriate, the drafting of Memoranda of Agreements (MOAs), Service Level Agreements (SLAs), or similar mechanisms for defining the relationships across organizational or federated boundaries, covering matters such as data, meta-data, services, interface protocols, access rights, ownership, and performance levels;

ii. Reporting through the appropriate TSO Assistant Deputy Director (ADD) to the DBSMC or to the AAs the results of their assessments.

e. The Components and CBM leaders will:

i. Further develop their mission-oriented architectures and transition plans consistent with the BEA-BMA, the BTP-BMA , and the rules of federation;

ii. Register the "To Be" architectural products or as built blue prints in the BMA architectural registry;

iii. Working through their PEOs/PMs, take responsibility to assure that their architectures and transition plans result in solutions that:

- Satisfy mission capabilities
- Are consistent with the BEA-BMA
- Are consistent with BMA rules of federation;

iv. For systems or applications that may have potential for reuse, register those templates in the BMA template registry;

v. CBM leaders will also proactively collaborate to integrate their mission oriented architecture products into the BEA-DoD so that it provides a single architectural representation of the capabilities and supporting programs for which the AAs are responsible.

f. The OBT-TSO will:

i. Support the DBSMC, the TCG, the AAs, the IRBs, the BMMP-PEO, and, when so directed, to assist other BEA and BTP stakeholders, in technical, analytical, and administrative matters including but not limited to:

- Developing, assimilating, consolidating and maintaining the BEA, the BTP and the Program Baseline
- Developing architecture and transitions plan components
- Assessing for compliance all appropriate technical and policy requirements
- Gathering and analyzing the necessary data and preparing reports as required, and serving as the liaison with the Executive and Legislative branches

- Executing communications, public affairs and outreach;

ii. Under direction from the DBSMC establish and chair the BMA Architecture Council, composed of:

- BMMP Chief Architect (TSO)
- Services Chief Architects
- Stakeholder Agency Chief Architects
- CBM Representatives
- BMMP-PEO Representative

iii. Assess the need for and establish as required review boards, including:

- In collaboration with federation entities, appointing board members
- Appointing the board chairs
- Approving the board charters;

iv. Assess the need for, establish and register COIs as required, including:

- In collaboration with federation entities, appointing COI members
- Appointing the COI chairs
- Approving the COI charters;

v. Evaluate and present possible options upon presentation of requested variances or cross-mission conflicts; and

vi. Consistent with the rules of federation and directives of ASD (NII)/DoD CIO, maintain the several registry repositories of potential interest to all BMA and other GIG participants. (Note that in some instances it will be more appropriate for some registries to be maintained at a lower level in the federation because it is of interest to a narrower range of participants.)

g. The OBT BMMP-PEO will:

i. Based on guidance from CBM leaders be responsible for developing the BEA-DoD, and the BTP-DoD;

ii. Be responsible for implementing systems deemed to be part of the DoD-wide federation member.

GLOSSARY

Capability. The ability to execute a specified course of action. It is defined by an operational user and expressed in broad operational terms. A capability includes the doctrine, organization, training, materiel, leadership and education, personnel, and facilities required to achieve a specified course of action.

Communities of Interest (COI)[16]. The inclusive term used to describe collaborative groups of users, who must exchange information in pursuit of their shared goals, interests, missions, or business processes, and who, therefore must have shared vocabulary for the information they exchange.

Configuration Management. A discipline applying technical and administrative direction and surveillance to: (1) identify and document the functional and physical characteristics of a configuration item; (2) control changes to those characteristics; and (3) record and report changes to processing and implementation status.

Data. A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means. Data and information are equivalent terms for the purposes of this document.

Data Asset. Any entity that is comprised of data. For example, a database is a data asset that is comprised of data records. A data asset may be a system or application output file, database, document, or web page. A data asset also includes a service that may be provided to access data from an application. For example, a service that returns individual records from a database would be a data asset. Similarly, a web site that returns data in response to specific queries would be a data asset. A human, system, or application may create a data asset.

Enterprise Information Environment Mission Area. The Department of Defense's Mission Area responsible for managing the part of the DoD portfolio known as the enterprise information environment (EIE), which is the common, integrated computing and communications environment of the GIG. The EIE is composed of GIG assets that operate as, or that assure, local area networks, campus area networks, tactical networks, operational area networks, metropolitan area networks, and wide area networks. The EIE is also composed of GIG assets that operate as, or that assure, end user devices, workstations, and servers that provide local, organizational, regional, or global computing capabilities. The EIE includes all software associated with the operation of EIE assets and the development environments and user productivity tools used in the GIG. The EIE includes a common set of enterprise services, called Net-Centric Enterprise Services (NCES), which provide awareness of, access to, and delivery of information on the GIG.

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[16] For details see "DoD Net-Centric Data Strategy", DoD CIO (9 May 2003).

Global Information Grid (GIG). The globally connected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel.

Information Assurance (IA). Information operations that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. This includes providing for restoration of information systems by incorporating protection, detection, and reaction capabilities.

Information Technology (IT). Any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the DoD Component. The term "information technology" includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related sources.

Interoperability. The ability of systems, units, or forces to provide data,information, materiel, and services to and accept the same from other systems, units, or forces and to use the data, information, materiel, and services so exchanged to enable them to operate effectively together. IT and NSS interoperability includes both the technical exchange of information and the end-to-end operational effectiveness of that exchange of information as required for mission accomplishment. Interoperability is more than just information exchange. It includes systems, processes, procedures, organizations and missions over the life cycle and must be balanced with information assurance.

Key Performance Parameters (KPPs). Those minimum attributes or characteristics considered most essential for an effective military capability. KPPs are validated by the Chairman of the Joint Chiefs of Staff.

Metadata. Information describing the characteristics of data; data or information about data; or descriptive information about an entity's data, data activities, systems, and holdings. For example, discovery metadata is a type of metadata that allows data assets to be found using enterprise search capabilities.

Metadata Registry. Repository of all metadata related to data structures, models, dictionaries, taxonomies, schema, and other engineering artifacts that are used to support interoperability and understanding through semantic and structural information about the data. A federated metadata registry is one in which multiple registries are joined electronically through a common interface and exchange structure, thereby effecting a common registry.

Mission Area. A defined area of responsibility with functions and processes that contribute to mission accomplishment.

Net-Centric. Relating to or representing the attributes of net-centricity. Net- centricity is a robust, globally interconnected network environment (including infrastructure, systems, processes, and people) in which data is shared timely and seamlessly among users, applications, and platforms.

Net-Centric Enterprise Services (NCES). A DISA program to implement key enabling capabilities for a net-centric enterprise. NCES will provide a common set of interoperable information capabilities in the Global Information Grid (GIG) to access, collect, process, store, disseminate, and manage information on demand for warfighters, policy makers, and support organizations.

Net-Centric Operations and Warfare (NCOW) Reference Model (RM). The NCOW-RM describes the activities required to establish, use, operate, and manage the net-centric enterprise information environment to include: the generic user-interface, the intelligent-assistant capabilities, the net-centric service capabilities (core services, Community of Interest services, and environment control services), and the enterprise management components. It also describes a selected set of key standards that shall be needed as the NCOW capabilities of the GIG are realized.

Net-Ready. The continuous ability to interface and interoperate to achieve operationally secure exchanges of information in conformance with enterprise constraints. The NR-KPP assesses the net-ready attributes required for both the technical exchange of information and the end-to-end operational effectiveness of that exchange.

Net-Ready Key Performance Parameter (NR-KPP). The NR-KPP assesses information needs, information timeliness, information assurance, and net-ready attributes required for both the technical exchange of information and the end-to-end operational effectiveness of that exchange. The NR-KPP consists of verifiable performance measures and associated metrics required to evaluate the timely, accurate, and complete exchange and use of information to satisfy information needs for a given capability. The NR-KPP is comprised of the following elements:

- Compliance with the NCOW RM
- Compliance with applicable GIG Key Interface Profiles
- Verification of compliance with DoD information assurance requirements
- Supporting integrated architecture products required to assess information exchange and use for a given capability.

BEA Relevant Discussion Areas

This paper was prepared in response to a number of questions on the issue of federation and integration raised by the BEA chief architect. The paper also has attached a DoD Architecture Strategic Plan 2004 to 2007, prepared by Truman Parmele of the ASD(NII) office. The paper and the attachment were discussed during a two hour session.

BEA Relevant Discussion Areas

1. Characterize the differences between **Integrated** and **Federated**.
   a. Upon reviewing DoD and CJCS directives, instructions and manuals, this comparison was expanded to include **Interoperability**. This was in part due to the fact that the term "integrated" alone was not defined anywhere; however, "Integrated Architecture" was used extensively and tended to refer to DODAF and integrated products. Additionally the term Integration showed up frequently in the context of the Joint Capabilities Integration and Development System (JCIDS) process. Interoperable and interoperability were used much more extensively and are defined in the published documents. Similarly, Federated was not defined in any DoD documents; however, Federated Architecture is defined in the published IRB CONOPS.
   b. Definitions:
      - Integrate (verb) – Source: Webster's Ninth New Collegiate Dictionary
        (no definition found in DoD documents)
        - To form, coordinate or blend into a functioning or unified whole
        - To unite with something else
        - To incorporate into a larger unit

        Unite
      - Integrated Architecture
        - Sources: CJCSI 3170.01E, 11 May 2005 and DODD 4630.5, 5 May 2004.
          An architecture consisting of multiple views or perspectives (operational view, systems view and technical view) that facilitates integration and promotes interoperability across capabilities and among related integrated architectures.

          Structured (e.g., DODAF) architecture products that facilitate
          - Uniting
          - Working Together
          - Sharing
        - [Note, DODD 4630.5 goes on to describe the operational, systems and technical standards architecture views.]
      - Interoperability
        - Source: CJCSI 3170.01E, 11 May 2005.
          The ability of systems, units or forces to provide data information, material and services to and accept the same from other systems, units or forces and to use the data, information, material and services so exchanged to enable them to operate effectively together. Information technology (IT) and National Security Systems (NSS) interoperability includes both

- the technical exchange of information and the end-to-end operational effectiveness of that exchanged information as required for mission accomplishment.

Work together and give info/services/material to one another

- Source: DODD 4630.5, 5 May 2004.
  [lead in same as above, with following appended] – Interoperability is more than just information exchange. It includes systems, processes, procedures, organizations and missions over the life cycle and must be balanced with information assurance.

- Federation – Source: composite from 2 dictionaries: Webster's Third New International Dictionary and Encarta World English Dictionary

A way for organizations to unite with distributed control over local matters

  - An organization entity composed of smaller organizational divisions united to achieve a common goal, within which the smaller divisions retain for themselves control over local matters.

- Federated Architecture – Source: IRB CONOPS, Signed by Mr. Wynne, 2 Jun 2005.

  - An approach for enterprise architecture development that is composed of a set of coherent but distinct entity architectures; the architectures of separate members of the federation. The members of the federation participate to produce an interoperable, effectively integrated enterprise architecture. The federation sets the overarching rules of the federated architecture, defining the policies, practices and legislation to be followed, as well as the inter-federate procedures and processes, data interchanges, and interface standards, to be observed by all members of the federation. Each federation member conforms to the enterprise view and overarching rules of the federation in developing its architecture. Internal to themselves, each focuses on their separate mission and architecture that support that mission.

Effectively Combines All

Approach for EA development:
- Hierarchy of overarching rules to be followed by members
- Distributed control over local matters
- Focus on:
  - Interoperability
  - Integrated Architecture

c. IDA Comments:

- Integration – It appears that the term integration as used with respect to Information Technology business systems, not defined in any formal document, is perceived by many to imply a broad ranging (ERP-like) single solution as an appropriate approach to transforming the DoD BMA.
  - High probability that this is the primary source of failures in previous attempts to transform DoD systems over the years (e.g., CIM).
  - The single system (all encompassing) solution has its place some times, but not always – especially in very large organizations such as the DoD.
- Federated Architecture – Within DoD the term Federated Architecture has only recently come into vogue. There is no official documentation describing Federated Architecture in detail. This has left a void allowing multiple interpretations on the part of stakeholder communities.

2. Characterize Architecture Compliance from 3 perspectives:

   a. ***System certification as part of a Federated Architecture***

      The system adheres to the rules of the Federation.

   b. ***What constitute a compliant architecture***

      A compliant architecture conforms to the rules, constraints, needs, formats, etc that have been established in the (then) current[17] version of the BEA.

   c. ***Review of issued policy: IRB CONOPS and recent IRB submission guidelines***

      i. NDAA required DoD to establish an investment review process incorporating provisions: (1) for the review and approval by an IRB; (2) threshold criteria to ensure appropriate review; and (3) guidance consistency issued by the Secretary of Defense and the DBSMC.

         - This has been accomplished

           (A) with the formally signed IRB CONOPS, and

           (B) is further being extended by the proposed additional IRB submission guidelines (*DoD Business Systems Investment Review Proposal Submission Guidelines*)

         - The IRB process stipulates that the Approval Authority (AA) must certify, and the DBSMC must approve this certification, that the System **is in compliance with (conforms to) the Enterprise Architecture**[18]

      ii. *Standard Set of IRB Criteria for Certification* is presented as Appendix E of the "Investment Review Process Overview and CONOPS for IRB, dated 17 May 2005, and signed out by Mr. Wynne on 2 Jun 2005. The criteria is segmented in 4 major groupings:

         1. Basic System Information
            - Provides basic system information
            - Focuses on funding request, budget status, and certification request
         2. Justification

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[17] The BEA will evolve in an orderly and controlled manner under the supervision of the DBSMC to accommodate changes in legislation, policy, capabilities and requirements, technology, etc.

[18] Compliance is one of 3 approved paths for obligations in excess of $1M, the other paths are that the system

- is necessary to achieve a critical national security capability or address a critical requirement in an area such as safety or security, or
- is necessary to prevent a significant adverse effect on a project that is needed to achieve an essential capability, taking into consideration the alternative solutions for preventing such adverse effect

- What DoD enterprise or component specific requirements this investment addresses
- What policy, law, or regulation this is aligned with

3. Transition Plan
   - Identifies how investment is aligned with Transition Plan
4. Architecture:
   - Identify the activities or processes supported
   - Identify capabilities /functions encompassed
   - Is it required to achieve BEA objective? If so which one?
   - Is it compliant with BEA and Component Arch
   - Does it comply with technical environment; if not is it part of the migration plan?
   - Are interfaces identified and schedules aligned?

iii. *DoD Business Systems Investment Review Proposal Submission Guidelines* (Version 07 15 05) – adds more definitive guidance

1. Attachment A – guidance for completing certification template
   - AV-1, TV-1 and OV-5 not required for FY05 - FY06 submissions
   - States "The BEA is being iteratively developed. Please contact your IRB support group for specific guidance"

IDA Comment: Believe it will be relatively easy to show appropriate linkage to BEA in this year's process; however, subsequent years likely to be more stringent.

2. Attachment B – CBMA BEA Compliance
   - "Until BEA 3.0 is complete the IRB will map systems to operational activity nodes of emerging BEA"

IDA Comment: This approach will likely continue as a minimum compliance condition.

   - Current required standard conditions are also listed for each of the CBMAs

IDA Comment: These are likely to be the most visible rules, policies, standards, systems alignment requirements, and constraints for the IRBs.

IDA Comment: Potential Gaps or Weaknesses
- **Provisions addressing IA, Interoperability, and Net-Centric Data Strategy are lacking.**
- **These critical areas represent extremely important rules, policies, standards, and practices that should be embedded in BEA as it evolves.**
- **NII has a major leadership role to address these gaps / weaknesses.**

3. How to proceed with Net-Centricity
    a. The Problem:
        i. Evolution of the GIG is continuing, with many concepts still undergoing changes. These include
            - Governance
            - Net-Centric Operations
            - NCES
            - Standards
            - Architecture
        ii. Simultaneously, the FEA-RM is also evolving and under development, leaving many details not fully defined.
        iii. This conspires to make explicit technical decisions and actions based on these decisions difficult to bring to fruition.
            - Policy, roles, and responsibility issues are much easier to resolve at this level of technical adolescence (See e.g., Data Sharing in a Net-Centric DoD – DODD 8320.2, 2 Dec 2004).
    b. Effect on BMMP:
        i. High probability many NCES Services will be inadequately defined, and not available when needed by BMA systems.
        ii. The FEA Data Reference Model and the DoD Enterprise Architecture Data Reference Model have insufficient detail to define a common ontology for an aligned data and meta-data description.
    c. Suggested Path Forward for BMMP:
        i. Identify which NCES and Data issues are of importance to the BMA.
            - Prioritize these items.
            - Communicate these to NII.
            - Apply pressure where possible.
        ii. Support the development of "temporary" workarounds when NII (or DISA) has not made available a necessary service or standard.
            - Be prepared to migrate to the "official" service or standard when it becomes available, or
            - Take the lead to make the BMA "workaround" the "de facto" service or standard.
        iii. Participate actively in the various working groups addressing the NCES and standards issues.

iv. Work aggressively in those areas which are mostly independent of the GIG, and the FEA-RM. These include:

- BEA data products including AV-2 and OV-7.
- Resolve semantic agreement issues within BMA.
- Identify authoritative data sources.
- Specify and facilitate implementation of Business Enterprise Services to supplement (or extend) those provided by NCES specifically for BMA needs.

DoD Architecture Strategic Plan 2004 to 2007

Enabling Net-Centricity

GLOBAL INFORMATION GRID

Embedding Net-Centricity in COCOMs

Capital Planning & Investment (CPIC)

Portfolio Management

Net-Centric Functional Capabilities Board

DoD Decision Making Based on Architecture Data

Integrated Architectures

Joint Functional Concepts

- Force Application
- Force Protection
- Joint Command & Control
- Battlespace Awareness
- Focused Logistics

Service System Requirements

Service Acquisition Programs
FORCEnet
C^2 Constellation
Army LandWarNet

Capability Based Decision Making

EDUCATION

AFCEA

Enterprise Architecture Certification Program at IRMC (NDU)

FEAC

Air Force Executive Architecture Course

ARCHITECTURE INFORMATION

NII Web Site DoD Enterprise Architecture HomePage

https://pals.osd.mil/enterprisearchitectures

PORTFOLIO MANAGEMENT

DARS

Validated Architecture Data

Capabilities Driven PfM

CPIC/POM Rationale

CONFIGURATION MANAGEMENT

CADM/DARS/DoDAF/Reference Models

"CHANGE MANAGEMENT DRIVER"

DoDEA RM

DoDEA BRM/SRM/TRM/DRM/PRM

Mapping the DoDAF to the FEA and OMB Form 300

NET-CENTRIC OPERATIONS WARFARE RM

NCOW Use Cases

Transition to ...

... Net Centricity

NCOW RM Version 2.0

DoD ARCHITECTURE RESEARCH LABORATORY

Center of Excellence for DoD Architecture Continuous Improvement

Shared environment for addressing and solving the "hard" DoD Architecture problems using "proofs of concept"

ARCHITECTURE COTS

"Tool Agnostic"

"Focus on Data – Let Customers Choose Tools"

Computas METIS
Popkin SA
Performa Provision
IBM/Rational Rose
IDS Sheer ARIS
⋮
Others

ESI
Popkin SA
IBM/Rational Rose
⋮
Others

DoD ARCHITECTURE REPOSITORY SYSTEM

DARS Operational on SIPRNET/NIPRNET
Structured and Unstructured Data Interoperability

Architecture Interoperability Project (AIP) Phase II

Metadata Management

CORE ARCHITECTURE DATA MODEL

CADM

- CADM Lite
- CADM XML Tags
- CADM Streamline

Architecture Data Specification

CADM Ontology

AP 233

ARCHITECTURE FRAMEWORKS

1997
C4ISR AF v2.0

2004
DoDAF v1.0

2006
DoDAF
- Net Centric
- Executables
- Portfolio Management

GOVERNANCE

Architecture Policy Guidance

CIO Executive Board

DoDAF

POLICIES/ DIRECTIVES

8100 | FEA Reference Models | DoD Reference Models | 4630

3170 CJCSI | 5000 | 8370 (Draft) | 6212 CJCSI

Implementing the BEA; The Importance of the Edge: Recommendations for (Enterprise Level) BMMP Activities –With Notes

This briefing evolved from discussions and a paper requested by the chief architect as a follow-up to the paper entitled BEA Relevant Discussion Areas. IDA was asked to expand on the challenges presented and for suggestions on how to facilitate business transformation. This briefing contains explanatory notes, which are important to understanding the issues discussed. In particular see the bolded paragraph on the Title notes page indicating that the focus of this paper is the instantiation of systems within a federated context.

Implementing the BEA; The Importance of the Edge

Recommendations for (Enterprise Level) BMMP Activities — With Notes

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October 2005

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DRAFT

This briefing presents some of the ideas contained in a note prepared in response to a request by Brian Wilczynski shortly before his transfer to NII. Brian had asked IDA to comment on the significant risks facing BMMP and for suggestions on how best to proceed with implementing the solution products for the DoD Business Mission Area (BMA) transformation. In this briefing ideas are presented to help establish priorities for the multitude of efforts currently ongoing in order to optimize the investments made to facilitate the transformation.

The theme of this briefing is NOT the BEA and its evolution — a very important issue — but rather the instantiation of the systems and programs that actually effect the desired business transformation.

Throughout this briefing, the term "solution systems and programs" is used to reference those products.

Agenda

- Critical Areas Relevant to BMA Transformation
  - Essential Elements
  - Participating Entities
  - Infrastructure
  - Core Enterprise Services (NCES)
  - Business Mission Area Services
  - Data
  - Systems / Programs
- Priorities and Approaches to Facilitate BMA Transformation
  - Work at the Edge
  - Work on the Basics
  - Defining the Priorities
  - Attracting Cooperation from the Community

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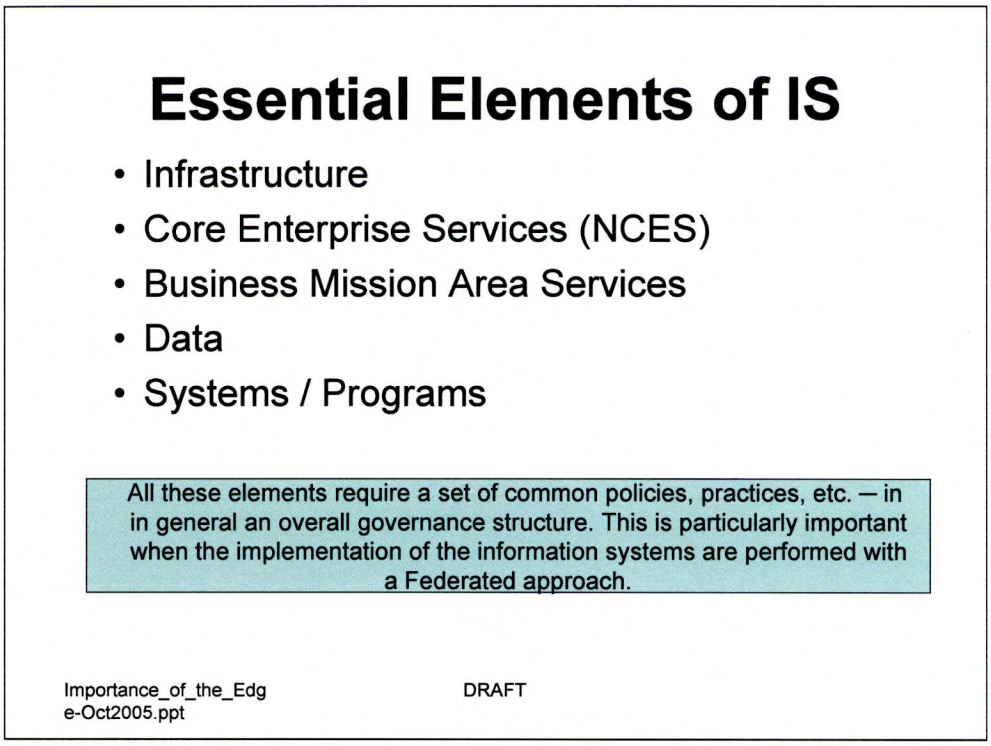
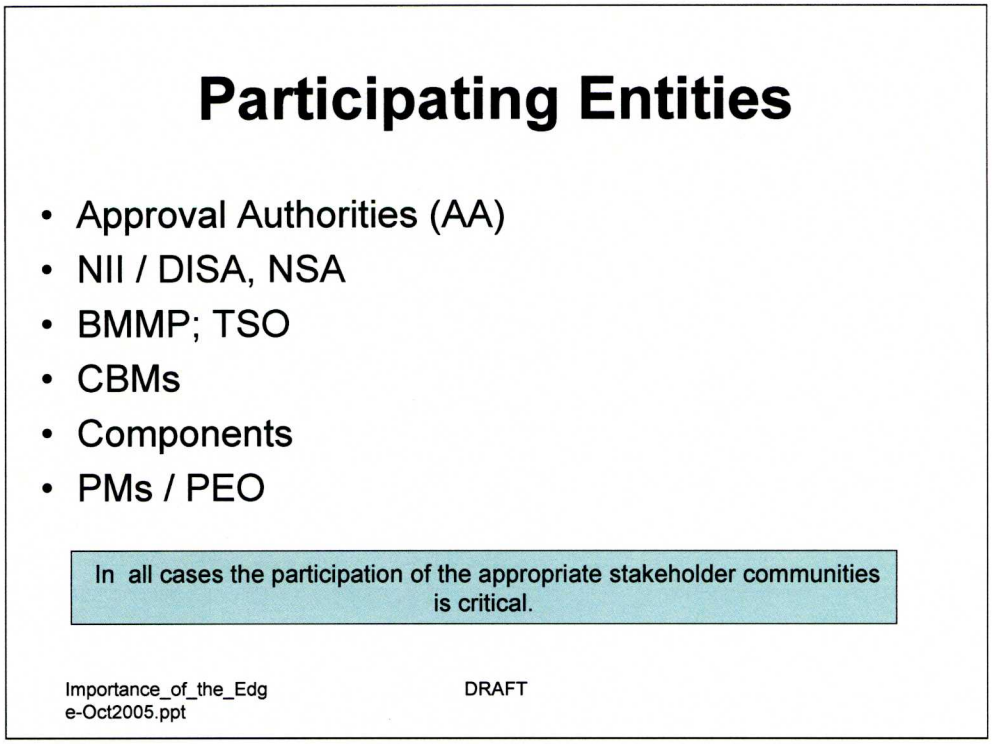
Approach: As a baseline to this assessment, we identify and characterize critical areas relevant to BMA transformation. From this perspective, we then identify approaches to facilitate the BMA transformation.

Critical Areas Relevant to BMA Transformation



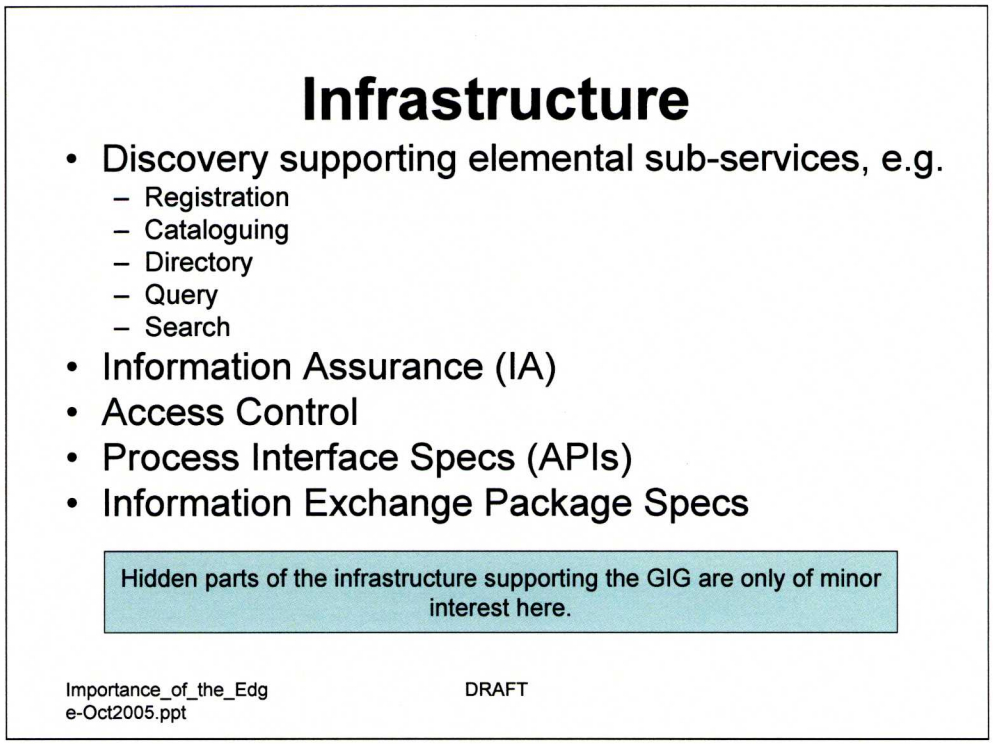
For the purposes of this discussion, we identify a number of basic elements of the Information Systems (IS) facilitating the BMA transformation. Categorizing these basic elements is somewhat arbitrary and may well be perceived differently depending upon the viewer's level of abstraction. However, the following list spans the necessary elements, all of which fall within the Global Information Grid (GIG).[1]

[1] These are not quite aligned with current GIG / NCES nomenclature.

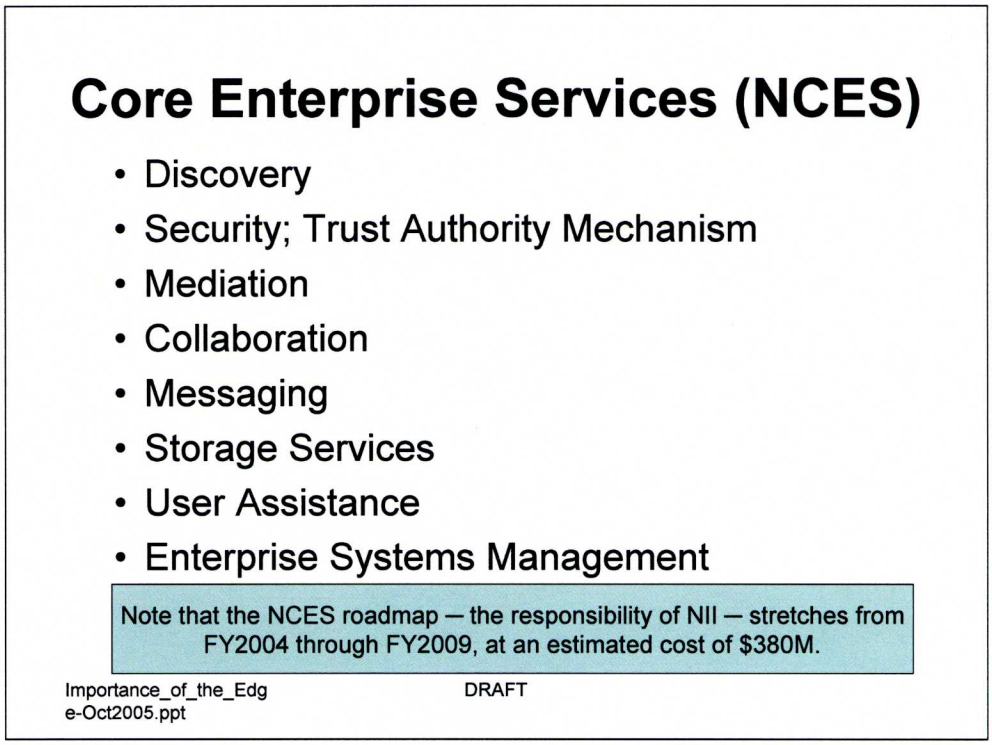


Note that the Business Transformation Agency (BTA) is included here as a Component.

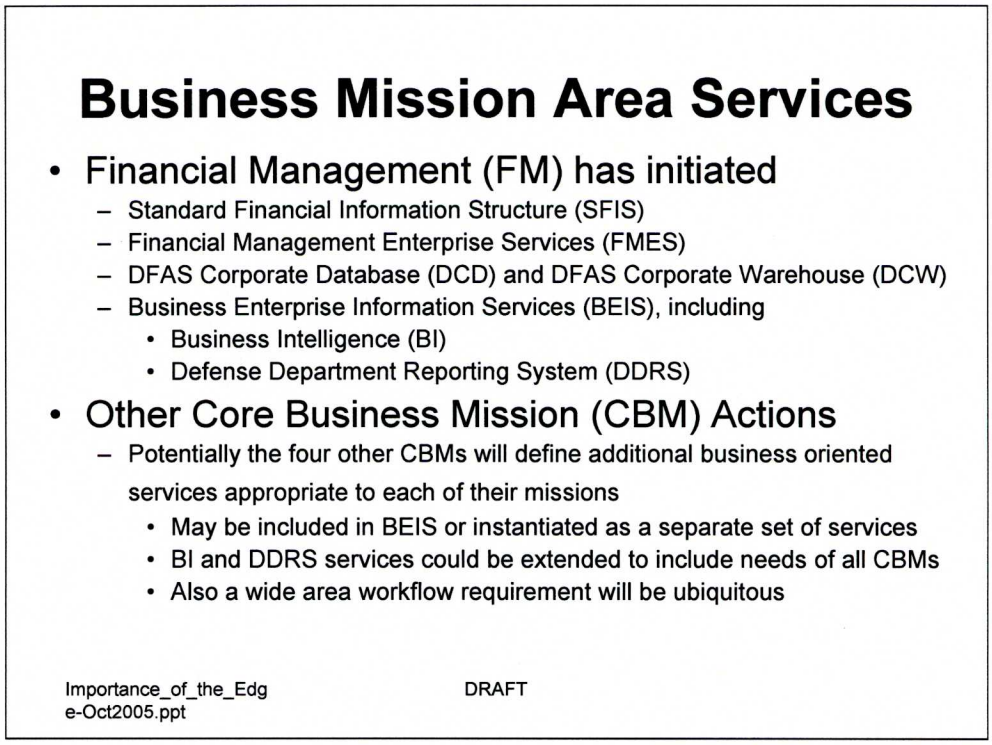
Partial or incomplete participation of all interested stakeholders will increase the business transformation risks.



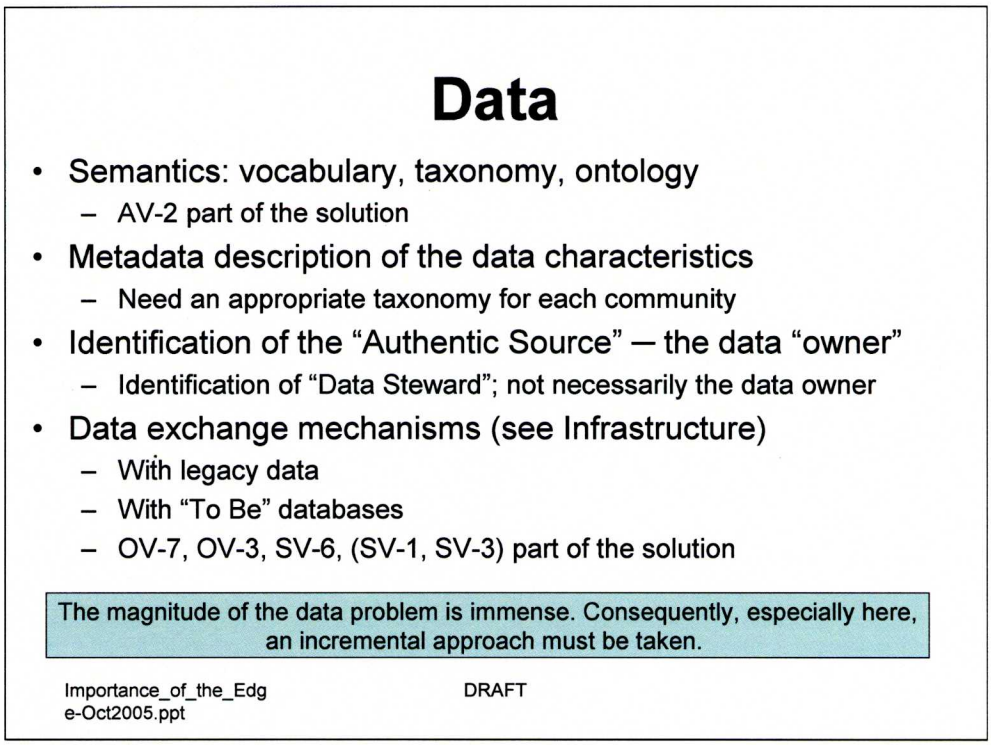
Included in the infrastructure are all the truly hidden assets and services that support the GIG. These include the communications links, the support hardware and software for the physical communications transport and the networks supported by them. Also included are the DISA Defense Enterprise Computing Centers (DECCs) and all of the mission specific servers across the Department. Where data is stored, processes are executed and connectivity is maintained, all important parts of the infrastructure, are not of major importance to this discussion.



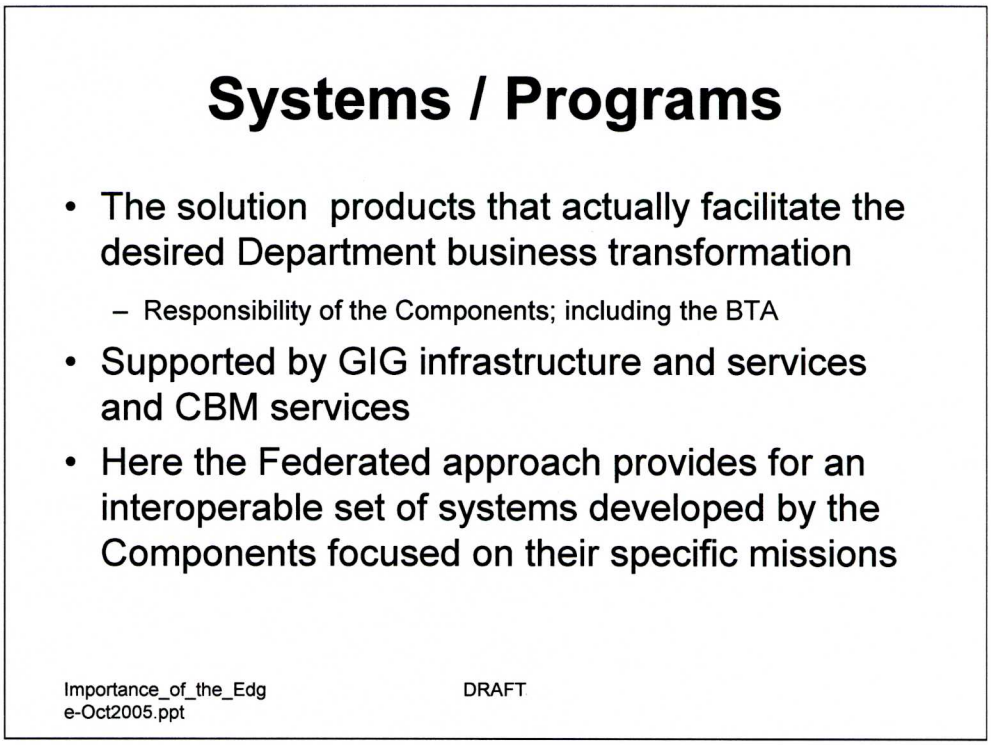
The effort to instantiate the NCES is very large, and as the roadmap indicates will not be completed (optimistically) before the end of FY2009. Therefore some of the essential NCES will not be available as the first sets of transformation solution systems and programs roll out. This will entail some work-arounds on the part of the PMs responsible for the early solution systems and programs.



Business transformation will be facilitated by broad endorsement and early adoption of essential business oriented services and standards that are perceived by the community to ease rather than to burden their efforts. The examples listed here should have the necessary characteristics. But they must be socialized across the community as early as possible.



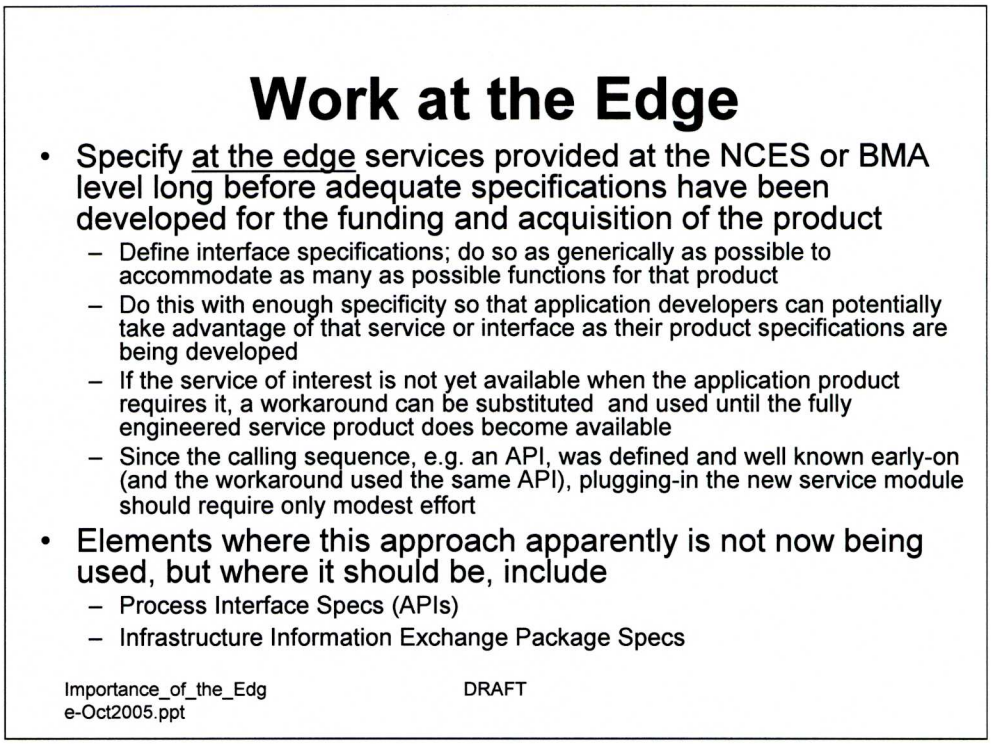
Most required data exists (usually in multiple, not necessarily consistent databases). There are many ambiguities, definitional conflicts and frequently unambiguous transformations are not possible.



Early application and demonstration of tiered responsibility using federated approaches will facilitate coherent system and program instantiations, help mitigate boundary issues and foster successful business transformation. If orchestrated with care this should lead to an accelerating interest in coherence amongst the Components, rather than the historical parochial NIH approach, that has always resulted in stovepipes.

A major caution is to limit the imposed rules of federation to the absolute minimum to achieve the required interoperability across the Department.

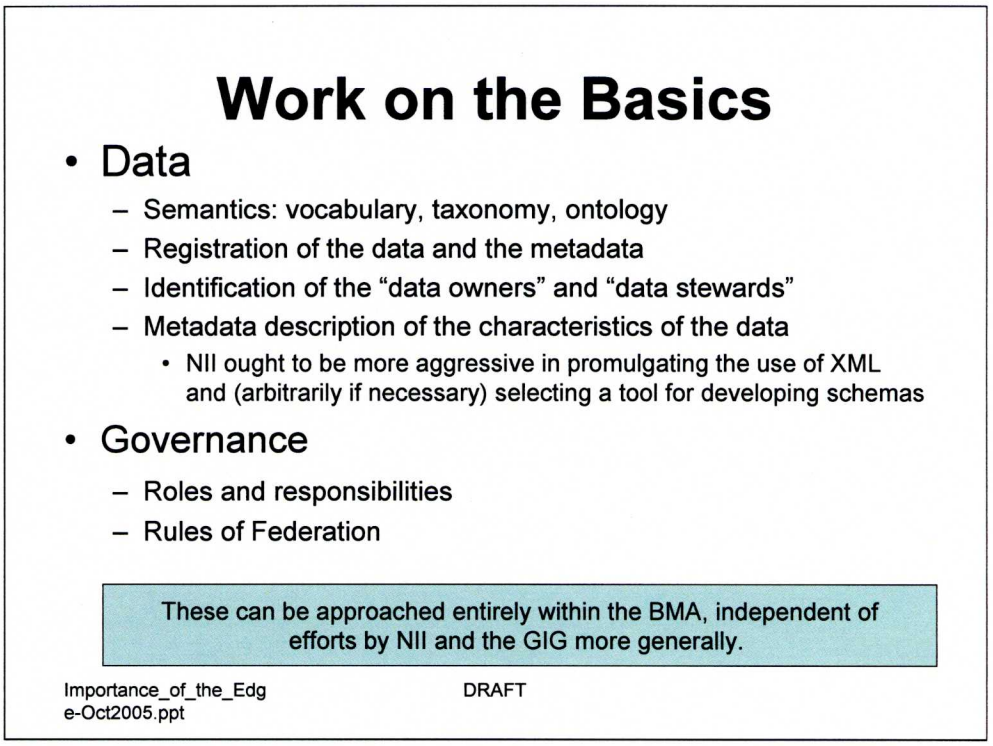
Priorities and Approaches to Facilitate BMA Transformation



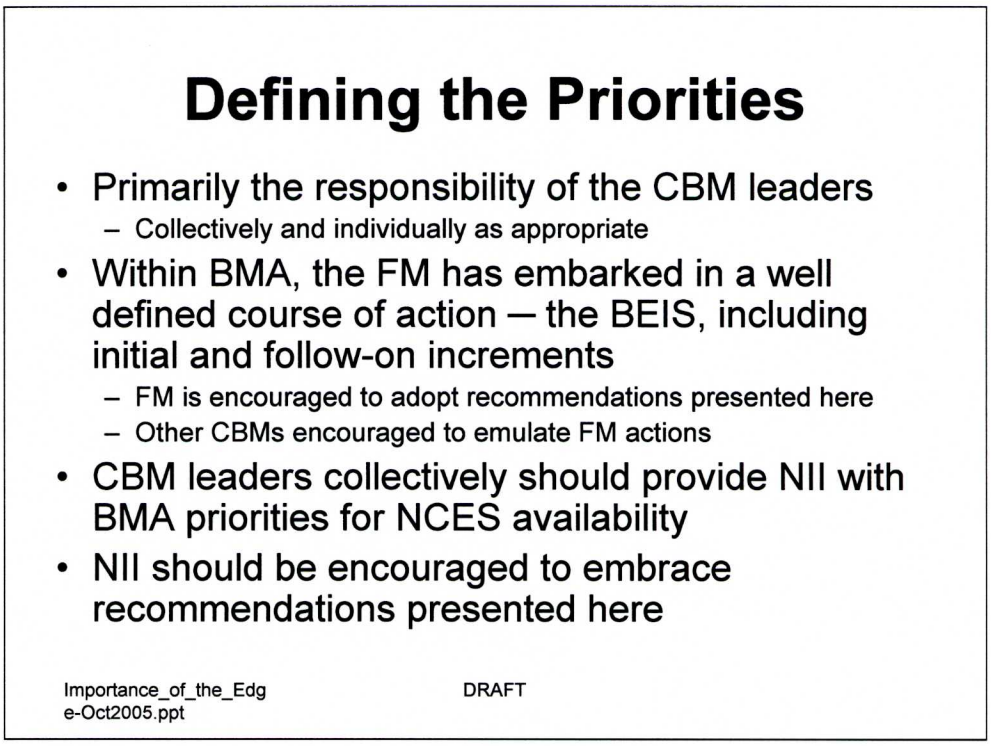
A wonderful example of this approach is the 7-Layer OSI Model developed for networks and in use today for the Internet. Here the interface standards for each of the 7-layers were specified early-on. This allows for different modules to be embedded at any of the 7-layers to handle different protocols, communications, etc. Currently, e.g. IPv6 is in the process of replacing IPv4, with no disruption of ongoing Internet functionality.

Another example is the GIG System Engineering Net-Centric Implementation Documents (NCIDs) being developed by Mike Kern of NII (see attached diagrams in Back-up). Here it is less clear that the interfaces will be defined and promulgated before all the modules are implemented.

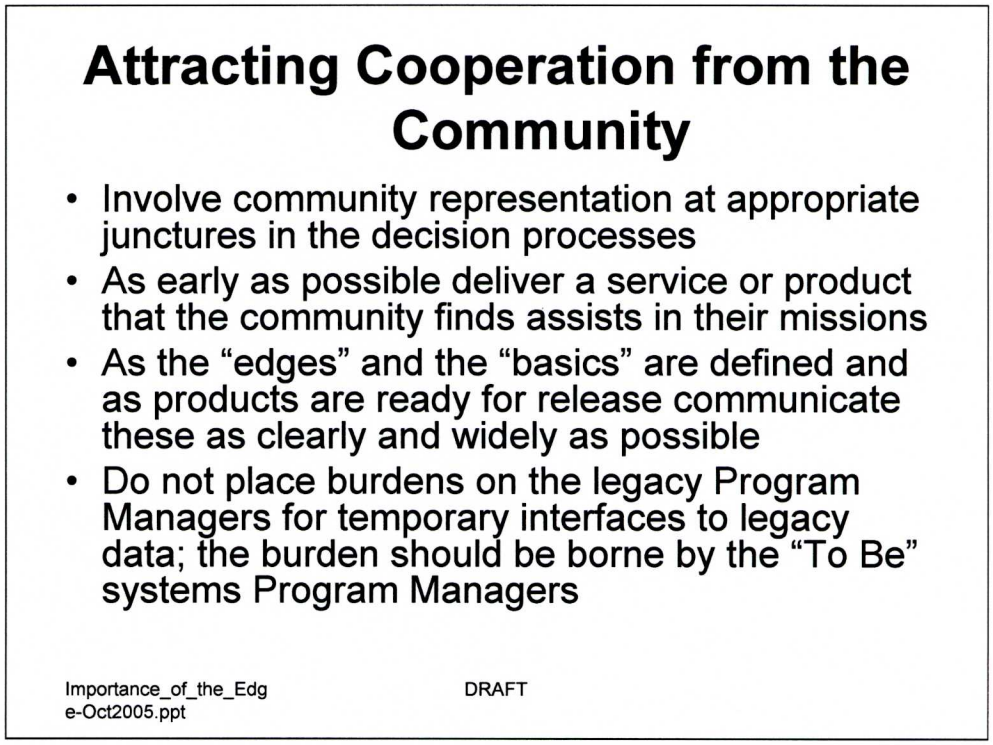
Note that in some cases a workaround service product may become the *de facto* service product. This is a very good approach to both acquiring the service product as early as possible and also as a mechanism of encouraging evolutionary improvements in such broadly used services.



These are quite basic issues, that should be approached with greater vigor then heretofore. Note that these apply both within the BMA and the larger GIG environment.



The approach to be taken should follow the latest strategy and philosophy that ultimately led to the development of the successful BEA 3.0, i.e. focus on the current priorities (BEPs) and address warfighter needs.

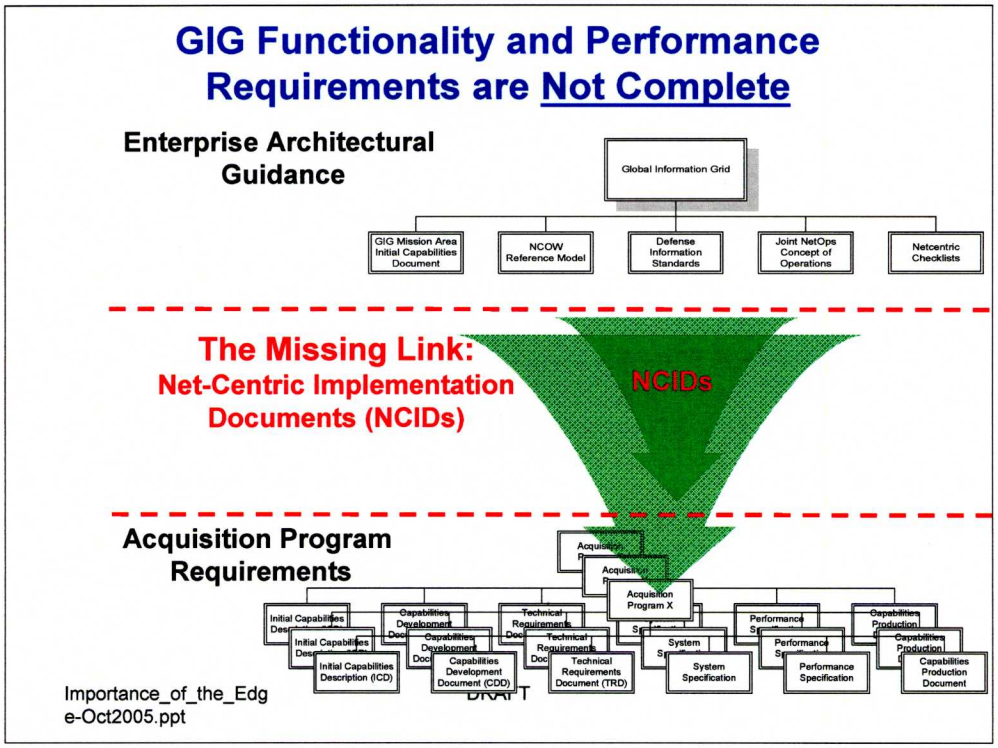


Do not repeat the errors of the early days of the BMMP BMSI. TSO's role is not that of a Program Manager. Rather it has a very important coordinating, technical support, integrating and communications role to play. Orchestrate the efforts of the Components to delineate the issues of importance and to associate into "Communities of interest" (COIs).

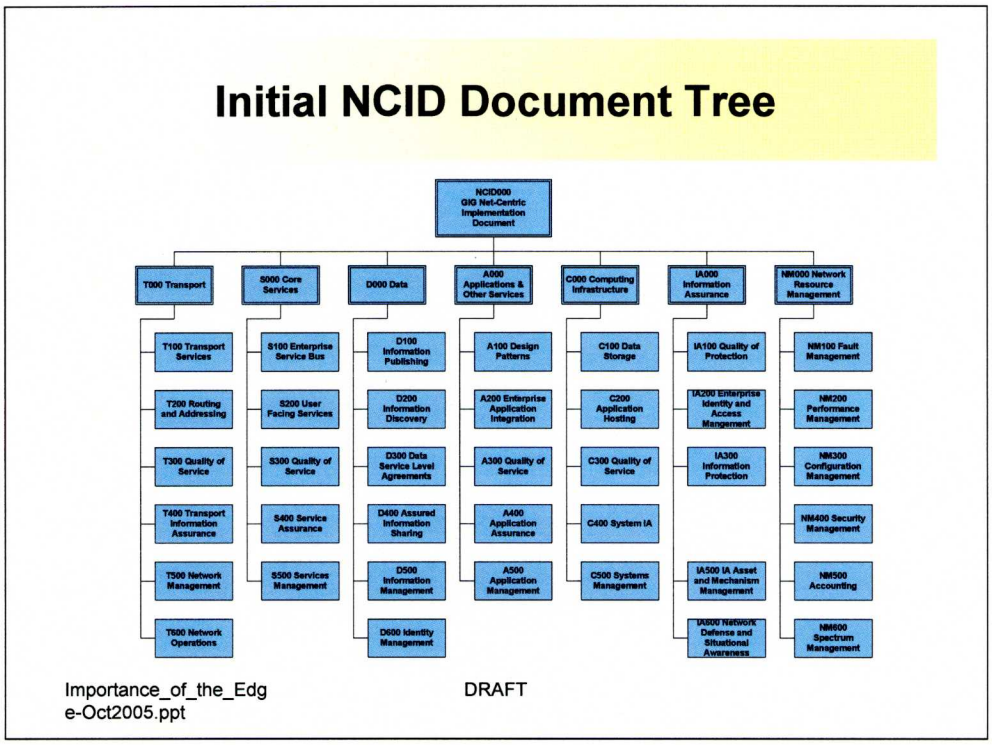
Note, that for some reason the term COI appears to be a problem within BMMP. Unless something has changed in recent months, that is the term that NII has been using to identify DoD entities across the Department with similar IT interests.

In any case such groups may or may not mean the same thing as the "Component Working Groups," now under discussion in TSO. Some potential definitional problem here ought to be resolved.

Back-up



Here the NII NCIDS team (under Mike Kern) has clearly indicated that there is a "missing link" between the GIG and the solution systems and programs. In this example, the issue is the required systems engineering linkages. But in a parallel scenario pertaining to business transformation, a "missing link" exists between the services provided by the GIG NCES and the solution systems and programs utilizing those services. But see next diagram.



As shown here, the NCIDS team has identified the required "missing links" in the systems engineering arena in great detail. But it is a major undertaking to instantiate all the processes shown here.

The theme presented in this briefing is that initially (as early as possible) define only the interfaces at the top and the bottom of the "missing link" shown in the previous diagram, i.e. "work at the edge." In that way, the PMs providing the several NCES services of the NCES and the PMs developing the solution systems and programs can be working on their respective systems in parallel.

Architecture Federation- Some of the Issues

This briefing was presented to a Federation Working Group, chaired by the BEA Chief Architect.

Architecture Federation— Some of the Issues

Al Brenner
IDA
October 25, 2005

Federation

- Definition – An organizational entity composed of smaller organizational divisions united to achieve a common goal, within which the smaller divisions retain for themselves control over local matters
- DoD is organized as a federation — Components have a degree of independence to better accomplish their respective missions
- To achieve modern, interoperable IS among all functions and all Components is an enormous challenge
- The GIG itself is an IS federation consisting of 3 (+1) members
  - Warfighter Mission Area
  - Intelligence Mission Area
  - Business Mission Area
  - Enterprise Information Environment infrastructure Mission Area
- These entities , e.g. BMA, are further partitioned into federation elements
- Aligning IS architecture development efforts with the organizational structure of the DoD maximizes the probability of success

Federated Architecture

- Definition — An approach for enterprise architecture development that is composed of a set of coherent but distinct entity architectures; the architectures of the separate members of the federation (See ETP)
- Apart from definitions in the ETP and the IRB CONOPS glossaries, there is no detailed elucidation of the term
  - There is wide diversity of understanding of the term within the community
- A federated architecture CONOPS exists in Draft form
  - It is being further refined
  - It should be coordinated, approved, and widely disseminated
- A set of "Bylaws" guiding the federated architecture approach is crucial for a successful set of application products, i.e. systems and programs, to result from this approach
- The object is to attain interoperability amongst the federated entity architectures, resulting in an effective "integrated architecture"
  - Consistent with policy and other constraints, while minimizing the burden in the development of the resulting program products

Federated Architecture Bylaws — Requirements

- Definitions
- Key Operational Principles
- Governance, including entity roles and responsibilities
- Scope of actions and controls
- Establish a Data Strategy, including
  - Data semantics: vocabulary, taxonomy, ontology
  - Data and metadata definition and registration procedures
  - Data exchange mechanisms
  - Specifications for data accuracy, reliability and timeliness
  - Identification of "data owners" and "data stewards"
- Establish inter-federate procedures and processes, including
  - Process exchange specifications
  - Identification of shared business processes
- Policy statement on alignment with other DoD and federal architectures, e.g.
  - GIG and its net-centric environment, NCES, etc.
  - FEA-RM

Parallel of DoD and e-Biz World Needs

- The rapidly expanding e-business world is a loosely coupled federation and can be characterized as
  - Participating companies want to interact with all others
  - But want independence to do it their way — to protect their trade secrets
- DoD is a slightly more tightly coupled federation — but not by much
  - Each Component wants independence to optimize their mission performance
  - But all understand and policy dictates the need to interoperate
- The diversity of corporate entities participating in developing capabilities to accomplish these ends is driving a quite coherent approach, allowing for
  - Heterogeneity, interoperability, and ever changing requirements
  - With characteristics which are
    - Location transparent
    - Loosely coupled
    - Protocol independent
- BMMP should take advantage of these "best practices"

The Basic Approach

- The client-server paradigm has evolved with the maturation of the web
  - First into a web-based object-oriented paradigm
  - Now into a web service-based paradigm — service oriented architecture (SOA)
- SOA brings into play the tools required for a successful federated approach
  - It is consistent with current net-centric doctrine
  - It is consistent with the BEA
- The basic ideas are all open source, i.e. non-proprietary
- Several large consortia of commercial, academic, and government participants are promoting the approach, including
  - World Wide Web Consortium (W3C)
  - Open Application Group (OAGi)
  - OASIS
  - Liberty Alliance Project
- **BMMP leadership is required to coordinate the development and to specify the details of how to organize these technologies**

Some Important BMA Activities

- Many CBM and Component entities are engaged in developing approaches consistent with this theme
- A good example is the FM intensive activity to develop a Data and Services Implementation Plan to support the instantiation of the SFIS; see
  - Standard Financial Information Structure (SFIS) CONOPS v2.4 (19Sept2005)
  - BMA Data and Services Implementation Plan; Initial Net-Centric Steps for SFIS v1.0 Briefing (26August2005)
- Another FM initiative is the development of the Business Enterprise Services (BEIS), which in addition to financial services, includes a DFAS Corporate Database (DCD) and a DFAS Corporate Warehouse (DCW)
- Other important BMMP references include
  - BMA Net-Centric Strategy v4.0 (29March2005)
  - Federated Business Enterprise Architecture CONOPS v0.9c Draft (5July2005)
  - Collaborative Architecture Development Environment (CADE) CONOPS v2.0 Draft (9Sept2005)
  - Architecture Development Methodology (ADM) for the Federated BEA v1.0 (15 August2005)

Some Issues

- The Good News
  - NII has major responsibilities to provide infrastructure and services
  - The current SOA approach is only beginning to mature; there are few deep-seated commitments yet made by the federate members
  - There are a number of very positive activities underway within the BMA community
- The Bad News
  - NII is unlikely to deliver many of its products in a timely manner; e.g. the NCES roadmap extends through FY2009 at a cost of $380M
  - The several BMA activities appear not to be interacting holistically

The proposal is to focus BMMP effort into coordinating the development of the BMA federated Bylaws

Comments on "No Such Thing as Federated Architecture"

This paper was prepared in response to an invitation for IDA's comments on the meaning of "federated architecture" from Brian Wilczynski, ASD(NII), chair of the Federated Joint Architecture Working Group, who was engaged in an e-mail discussion with two of his support contractors on that subject.

Comments on "No Such Thing as Federated Architecture"

A bit belatedly, I am responding to Brian's request that I join in on this interesting discussion. Let me start by saying that I agree with much of the explanation of the continuing dialogue, initiated by Alex late Thursday, January 5, and especially in his message of this past Saturday morning. But contrary to his indication in his last message, I do believe that much of the difficulty in these discussions — not only here, but throughout DoD — is in the definition of terms. Indeed much of the discussion amongst this small group of experts arises from ill-defined terminology. Think of the problem that presents to the much larger community, which must design, develop, acquire and oversee the IS/IT to which the architecture relates. Let me elaborate a bit.

The DoDAF(v1.0) in Section 1.2 clearly articulates the first major definitional problem, to wit — "the term architecture is generally used both to refer to an *architecture description* and an *architecture implementation*." The discussion continues to indicate that in the DoDAF "the term architecture will be used as a shortened reference to *architecture description*." But of course as Alex indicates you don't really federate the *architecture description*, but the *(architecture) implementation* of the various *architecture descriptions*. It is the implementations — I prefer the instantiations — or as Alex and the community calls them, the systems, that are federated.

But the definition of terms problem permeates a much larger set of issues. In the DoDAF, the term *integrated architecture* (Section 1.5) is defined as "an architecture description that has integrated Operational, Systems and Technical Standards Views." For the architecture description of some system, this makes good sense, whereas I believe it is inappropriate and unimplementable if applied to an enterprise level architecture, which invariably means something like a system of systems — in terms even broader than that introduced by Jeff in his comments.

I did not participate in the FJAWG, nor did I attend the CISA Conference, so the definitions presented by Brian and Jeff are new to me. But here I also see the ambiguity of the term "architecture" causing much of the difficulty. First the term *architecture integration* must not be confused with the DoDAF term of *integrated architecture*. Here, as defined, *architecture integration* concerns itself with standardization of terms [presumably data semantics, data and metadata, data and process exchange specifications, etc.][19] so that the disparate *architecture descriptions* "result in a set of data and products [*architecture implementations*] that support Joint operations and development efforts." So I agree with Jeff that this really refers to the systems (i.e. *architecture implementations*) and not to the DoDAF architecture (i.e. *architecture descriptions*). I do note that I am not comfortable with calling this *architecture integration*, because the term "integration" for many people carries a connotation of an integrated system. For me the goal is a federation of systems, which functions as if the enterprise is integrated, but allows for the internal diversity implied by federation.

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[19] The [] enclose editorial comments by the author.

The two other FJAWG definitions for *federated architecture* and *disparate architectures* are not unreasonable if one interprets them in the *architecture implementation* rather than the *architecture description* context.

For me observing the BMMP development of the Business Enterprise Architecture (BEA), a DoDAF compliant enterprise architecture, in which a high level OV6c is designated the Enterprise Business Process Model (EPBM) has been most instructive. The development of the BEA, including the development of many of the essential DoDAF views at some detailed level has been enormously valuable in guiding the business process reengineering (BPR) across all of the Business Enterprise Priorities (BEPs). But no one should expect that systems (i.e. *architecture implementations* — or as I prefer, instantiations) acquired by the Services/Agencies will adhere in detail to the "To Be" DoDAF *architecture descriptions*. Since, whenever possible, one wants to take advantage of state-of-the-art COTS and extant GOTS products which provide the required functionality, best business practices will usually deliver a better engineered and tested product at lower cost and in shorter time. The PM only must ensure that all data, message and API exchanges outside the system adhere to the requirements imposed by the federation. The "As Built" architecture delivered by the contractor becomes the repository "As Is" DoDAF *architecture description*.

Finally, a comment concerning the DoDAF lexicon and adherence to it. Many changes were incorporated during the more than ten years of evolution of the C4ISR Architecture Framework to the current DoDAF v1.0. The most important reason for developing a formal architecture framework is to be able to readily evolve the architecture to accommodate rapidly changing hardware and software technology and equally rapidly changing requirements — or if you prefer capabilities. Likewise the framework itself must also evolve to accommodate these changes. [Currently the WWW is undergoing enormous changes, as is the Internet itself, for just these same reasons.] Please note that there is not a single mention[20] in the DoDAF of federation or federated (not to be confused with federal). Certainly it is time to evolve the DoDAF.

And in this regard, I turn your attention to the "Reality" (Slide 3) of the Brian/Jeff FJAWG presentation at the CISA Conference, with which I fully agree, reproduced here for your convenience.

> "REALITY: While there have been significant advances in the development and use of architectures in recent years, the Department still lacks effective processes and governance for federating and integrating disparate architectures."

Those of us trying to alleviate these problems should be working to better introduce and disseminate these federation ideas into the broader DoD community and work to modify both the technical and policy directives so that we can change this unacceptable "Reality."

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[20] There is one exception. In Volume II, Figure 5-30, the SV-8 evolution has a Legacy Mainframe System evolving over five years to a Federated Distributed System. Apart from this diagram, there is no discussion of this federated state in the text.

Acronyms

AA	Approval Authority
ADD	Assistant Deputy Director
ADM	Architecture Development Methodology
AIT	Architecture Integration Team
API	Application Program Interface
ASD	Assistant Secretary of Defense
ASD (C3I)	Assistant Secretary of Defense for Command, Control, Communications and Intelligence
ASD (NII)	Assistant Secretary of Defense (Networks and Information Integration)
AT&L	Acquisition, Technology & Logistics
BEA	Business Enterprise Architecture
BEIS	Business Enterprise Information Service
BEP	Business Enterprise Priority
BES	Business Enterprise Services
BMA	Business Mission Area
BMMP	Business Management Modernization Program
BMSI	Business Modernization and Systems Integration
BPM	Business Process Model/Modeling
BPR	Business Process Reengineering
BTA	Business Transformation Agency
BTP	Business Transformation Plan
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CAC	Common Access Card
CADE	Collaborative Architecture Development Environment
CADM	Core Architecture Data Model
CBM	Core Business Mission
CBMA	Core Business Mission Area
CCB	Configuration Control Board
CIO	Chief Information Officer
CISA	Certified Information Systems Auditor
CJCS	Chairman of the Joint Chiefs of Staff

CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CM	Configuration Management
COI	Community of Interest
CONOPS	Concept of Operations
COTS	Commercial Off-The-Shelf
DARS	Defense Architecture Repository System
DBSMC	Defense Business Systems Management Committee
DBT	Defense Business Transformation
DCD	DFAS Corporate Database
DCW	DFAS Corporate Warehouse
DECC	Defense Enterprise Computing Center
DFAS	Defense Finance and Accounting Service
DISA	Defense Information Systems Agency
DoD	Department of Defense
DODD	Department of Defense Directive
DoDAF	DoD Architecture Framework
DUSD	Deputy Under Secretary of Defense
EA	Enterprise Architecture
EBPM	Enterprise Business Process Model
EIE	Enterprise Information Environment
ERP	Enterprise Resource Planning
ETP	Enterprise Transition Plan
FEA	Federal Enterprise Architecture
FIN	Finance Domain
FJAWK	Federated Joint Architecture Working Group
FM	Financial Management (Core Business Mission)
FMMP	Financial Management Modernization Program
GAO	Government Accountability Office
GIG	Global Information Grid
GOTS	Government Off-The-Shelf
HRM	Human Resources Management (Core Business Mission)
IA	Information Assurance
IDA	Institute for Defense Analyses
IRB	Investment Review Board

IS	Information System
IT	Information Technology
IV&V	Independent Verification and Validation
JCIDS	Joint Capabilities Integration and Development System
JCS	Joint Chief of Staff
KPP	Key Performance Parameter
LOG	Logistics (Domain)
MOA	Memorandum of Agreement
NCES	Net-Centric Enterprise Services
NCID	Net-Centric Implementation Documents
NCOW	Net-Centric Operations and Warfare
NDAA	National Defense Authorization Act
NII	Networks and Information Integration
NR	Net Ready
NSA	National Security Agency
NSS	National Security System/Strategy
O&M	Operations and Maintenance
OAGi	Open Application Group
OBT	Office of Business Transformation
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
OSI	Open System Interconnection
OV	Operational View
OV - 1	HighLevel Operational Concept Description
OV - 2	Operational Node Connectivity Description
OV - 3	Operational Information Exchange Matrix
OV - 4	Organizational Relationships Chart
OV - 5	Operational Activity Node Tree and Model
OV - 6a	Operational Rules Model
OV - 6b	Operational Object/State Transition Diagram
OV - 6c	Operational Event/Trace Description
OV - 7	Logical Data Model
OV-SV-TV	Operational View, Systems View, Technical Standards View

P&R	Personnel and Readiness
PA&E	Program Analysis and Evaluation
PDF	Portable Document Format (Adobe Acrobat)
PEO	Program Executive Office
PfM	Portfolio Management
PM	Program Manger
PPB&E	Planning, Programming, Budgeting, and Execution
PSA	Principal Staff Assistant
RM	Reference Model
SecDef	Secretary of Defense
SFIS	Standard Financial Information Structure
SLA	Service Level Agreement
SOA	Service Oriented Architecture
SOW	Statement of Work
SV	Systems View
SV - 1	Systems Interface Description
SV - 2	Systems Communications Description
SV - 3	Systems-Systems Matrix
SV - 4	Systems Functionality Description
SV - 5	Operational Activity to System Function Traceability matrix
SV - 6	System Information (Data) Exchange matrix
SV - 7	Systems Performance Parameter Matrix
SV - 8	Systems Evolution Description
SV - 9	Systems Technology Forecast
SV - 10a	Systems Rules Model
SV - 10b	Systems State Transition Description
SV - 10c	Systems Events/Trace Descriptions (Sequence Diagrams)
SV - 11	Physical Schema
TP	Transition Plan/Planning
TSO	Transformation Support Office
TV	Technical Standards View
TV - 1	Technical Standards Profile
TV - 2	Technical Standards Forecast

UAO	Unqualified Audit Opinion
USC	United States Code
USD	Under Secretary of Defense
USD (AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USD (P&R)	Under Secretary of Defense (Personnel and Readiness)
USD (C)	Under Secretary of Defense (Comptroller)
USG	United States Government
W3C	World Wide Web Consortium
WBS	Work Breakdown Structure
WMA	Warfighting Mission Area
WTC	World Trade Center
WWW	World Wide Web
XML	Extensible Markup Language

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13. SUPPLEMENTARY NOTES

14. ABSTRACT

DoD is engaged in transforming itself in multiple domains to better perform its mission in the word as it exists today by utilizing the most modern technology. This includes transforming and modernizing the Business Mission area to ensure that the right capabilities, resources and materiel are rapidly delivered to our warfighters. This effort produced a Business Enterprise Architecture (BEA) and an associated Enterprise Transition Plan (ETP), as the first step in satisfying requirements imposed on DoD in the National Defense Authorization Act (NDAA). The success of the Defense business transformation relies on instantiating effective programs by the Services and Agencies, aligned with the BEA and other DoD and federal policies. For over two years IDA has been encouraging a federated approach to facilitate this effort. This approach is now broadly accepted as appropriate to facilitate the work needed for the Defense business transformation. This document contains a collection of papers and briefings that IDA has used to assist in adapting this approach.

15. SUBJECT TERMS

Federated Architecture, Architecture, Transition Plan, Business Enterprise Architecture (BEA), Business Management Modernization Program (BMMP).

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